

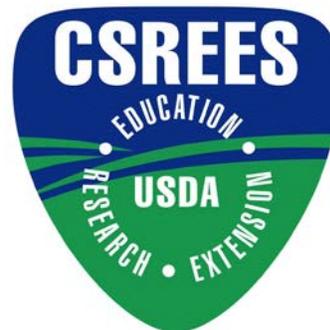
Self-Review for 2006 Portfolio Review Expert Panel

Nutrition Portfolio

Supporting Objectives:

- Objective 4.1. Improve Human Health by Better Understanding the Nutrient Requirements of Individuals and the Nutritional Value of Foods and
- Objective 4.2. Promote Healthier Food Choices and Lifestyles

CSREES Goal 4: Improve the Nation's Nutrition and Health



Executive Summary

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Section I – Portfolio Review Background Information

Portfolio Assessment Report

Introduction

This introduction provides background information to prepare the reader for the following evaluation Sections II-IV. Main topics covered include:

- Background on the Portfolio Review Expert Panel (PREP) Process
- Background on the Cooperative State Research, Education and Extension Service (CSREES) and its funding authorities
- Portfolio Self-Review document organization

Background on the Portfolio Review Expert Panel (PREP) Process

New Accountability Requirements

The executive Office of Management and Budget (OMB) now requires that all Agencies systematically examine and rate, via OMB’s Program Assessment Rating Tool (PART- explained below), their efforts and ability to achieve stated objectives, goals, and missions. Agencies are also directed to conduct “independent” evaluations of their programs and report on these in the PART. The Cooperative State Research, Education and Extension Service (CSREES) has responded to this directive by implementing the Portfolio Review Expert Panel (PREP). These reviews meet OMB’s requirement of “independent” evaluations on several levels. Most significantly, the Office of the Administrator has designed the PREP process and manages its implementation. The Office convenes the external panels, commissions self-review papers from relevant topic area managers as a key input into the process, and receives the panel’s report recommendations independent of programmatic influence. Additionally, the focus of the PREP is tailored to OMB’s primary interest, the outcomes and impacts of agency work, and not towards documenting agency processes such as the administration of grants, peer review selection of proposals to be funded, or other administrative functions like the hiring or managing of personal.

OMB created the PART as a means to link budget and performance, improve programs, and revise or eliminate those which are not meeting their goals. It is now required that CSREES and all other Federal Agencies report quantitative performance measures in Budget and Performance Integration (BPI) charts as part of the annual budget justification process. The BPI charts are mandated by the President’s Management Agenda (PMA) and described below.

The four sections of OMB’s PART are:

- 1) Program Purpose & Design
- 2) Strategic Planning
- 3) Program Management
- 4) Program Results

The PMA is comprised of five goals, including budget and performance integration:

- 1) Strategic management of human capital
- 2) Competitive outsourcing
- 3) Improved financial management
- 4) Expanded electronic government
- 5) Budget and performance integration.

In order to provide the necessary assessment required by the PART and PMA, the PREP process was implemented in 2003 and all research, education, and extension activities being conducted under the auspice of CSREES were organized into 14 program portfolios. A portfolio of work is the cluster of CSREES research, education, and extension programmatic efforts that are funded, implemented, and integrated over time to solve national problems, meet national needs, and realize economic and other opportunities for citizens. Portfolios of topically-linked issues are aligned to support the 14 United States Department of Agriculture (USDA)/CSREES Strategic Objectives, which support the five USDA/CSREES Strategic Goals. The work of each Portfolio is organized into Knowledge Areas (KAs). The Portfolios that comprise Goal 1 were reviewed for the first time in 2004; Goals 3 & 5 in 2005; and Goals 2 & 4 in 2006.

The full PART checklist of questions to which the Agency must respond is available in the evidentiary materials which will be provided at the CSREES Portfolio External Panel meeting. The score from this panel review will serve as a quantitative performance measure in the PART. The PMA document is also available for review in the evidentiary materials.

The Portfolio Review Process highlights the emphasis CSREES places on data availability and good accountability and evaluation. It is intended to be used to both meet external requirements and to provide managers with the feedback they need to properly manage and improve their programs. More detail on the development of the Portfolio process and how it relates to the strategic plan of both CSREES and the over arching USDA strategic plan is provided below.

Using the Strategic Plan and Portfolios to Address Issues

In 2004, CSREES adopted its current Strategic Plan which is fully integrated with the USDA Plan. In other words, the goals are the same and CSREES objectives are written to show how the Agency uniquely supports USDA objectives. For the reasons detailed above portfolios that best cover the work under each strategic objective were created. The current Strategic Plan was used to organize these Portfolios, although two other strategic plans were publicized by USDA during the 1999-2003 timeframe. Figure 1 presents a crosswalk of the two most recent CSREES Strategic Plans, illustrating that, although the goals and objectives had undergone some rewriting, the underlying focus remained consistent. The KAs that serve as the basis for classifying work have, over time, continued to be essentially constant, although the list was reviewed and updated in 2004. (The CSREES Strategic Plans for 1997 – 2002, and 2004 – 2009 are included in the Evidentiary Materials)

Figure 1: Crosswalk of CSREES Strategic Goals and Objectives, 2004-2007 and 1997-2002 Strategic Plans

Strategic Goal		Objective
2004-2009	1997-2002	
Goal 1 Enhance Economic Opportunities for Agricultural Producers	Goal 1 An Agricultural Production System That is Highly Competitive in the Global Economy	Objective 1.1, 2004-2009 Provide Information, Knowledge and Education to Help Expand Markets and Reduce Trade Barriers
		Objective 1.4, 1997-2002 To Improve Decision Making on Public Policy Issues Related to the Productivity and Global Competitiveness of the U.S. Agricultural Production System
		Objective 1.2, 2004-2009 Support International Economic Development and Trade Capacity Building Through Research and Technical Assistance
		Objective 1.3, 2004-2009 Provide the Science-Based Knowledge and Technologies to Generate New or Improved High Quality Products and Processes to Expand Markets for the Agricultural Sector
		Objective 1.1, 1997-2002 To Produce New and Value-added Agricultural Products and Commodities.
		Objective 1.4, 2004-2009: Provide Science-Based Information, Knowledge and Education to Facilitate Risk Management by Farmers and Ranchers
		Objective 1.5, 2004-2009 Contribute Science-based Information, Analysis, and Education to Promote the Efficiency of Agricultural Production Systems
		Objective 1.2, 1997-2002 To Increase the Global Competitiveness of the U.S. Agricultural Production System
		Objective 1.3, 1997-2002 To Recruit and Educate a Diverse Set of Individuals for Careers as Future Scientists, Professionals and Leaders Who Are Well-trained in Agricultural Sciences
Goal 2 Support Increased Economic Opportunities and Improved Quality of Life in Rural America	Goal 5 Enhanced Economic Opportunity and Quality of Life for Americans	Objective 2.1, 2004-2009 Expand Economic Opportunities in Rural America by Bringing Scientific Insights into Economic and Business Decision Making
		Objective 5.1, 1997-2002 To Increase the Capacity of Communities and Families to Enhance Their Own Economic Well-being
		Objective 2.2, 2004-2009 Provide Science-based Technology, Products and Information to Facilitate Informed Decisions Affecting the Quality of Life in Rural Areas
		Objective 5.2 1997-2002 To Increase the Capacity of Communities, Families, and Individuals to Improve Their Own Quality of Life

Figure 1: Crosswalk of CSREES Strategic Goals and Objectives (contd.)

Strategic Goal		Objective
2004-2009	1997-2002	
Goal 3 Enhance Protection and Safety of the Nation’s Agricultural and Food Supply	Goal 2 A Safe, Secure Food and Fiber System	Objective 3.1, 2004-2009 Reduce the Incidence of Foodborne Illnesses and Contaminants Through Science-based Knowledge and Education
		Objective 2.2, 1997-2002 To Improve Food Safety by Controlling or Eliminating Foodborne Risks
		Objective 3.2, 2004-2009 Develop and Deliver Science-based Information and Technologies to Reduce the Number and Severity of Agricultural Pest and Disease Outbreaks
Goal 4 Improve the Nation’s Nutrition and Health	Goal 3 A Healthy, Well Nourished Population	Objective 4.1, 2004-2009 Improve the Nutritional Value of the U.S. Food Supply by Enhancing the Health Promoting Properties of Food Products
		Objective 4.2, 2004-2009 Promote Healthier Food Choices and Lifestyles Through Research and Education
		Objective 3.1, 1997-2002 To Optimize the Health of Consumers by Improving the Quality of Diets, the Quality of Food, and the Number of Food Choices
		Objective 3.2, 1997-2002 To Promote Health, Safety and Access to Quality Health Care
Goal 5 Protect and Enhance the Nation’s Natural Resource Base and Environment	Goal 4 Greater Harmony Between Agriculture and the Environment	Objective 5.1, 2004-2009 Provide Science-based Knowledge and Education to Improve Management of Forest and Rangelands
		Objective 4.1, 1997-2002 To Develop, Transfer & Promote the Adoption of Efficient and Sustainable Agricultural, Forestry and Other Resource Conservation Policies, Programs, Technologies & Practices That Ensure Ecosystems Integrity and Biodiversity
		Objective 5.2, 2004-2009 Provide Science-based Knowledge and Education to Improve Management of Soil, Air, and Water to Support Production and Enhance the Environment
		Objective 4.2, 1997-2002 To Develop, Transfer and Promote Adoption of Efficient and Sustainable Agricultural, Forestry and Other Resource Policies, Programs, Technologies and Practices that Protect, Sustain and Enhance Water, Soil and Air Resources
		Objective 4.3, 1997-2002 To Improve Decision Making on Public Policies Related to Agriculture and the Environment

In designing an evaluation system to meet the new PART and BPI requirements, CSREES Office of the Administrator (Planning and Accountability (P&A)) conducted an extensive review of the approaches being used by others to assess federal research efforts. Adding to the complexity of designing an appropriate evaluation system was the fact CSREES, unlike its sibling research agencies in USDA, has outreach education and higher education support components. Not only are there thousands of grants focused on solving national problems, there are also three main programmatic areas. CSREES-sponsored research, education, and extension work is funded from multiple authorities and funding sources (CSREES has 57 Congressional funding lines). Ultimately it was concluded that reviewing and evaluating the thousands of research grants funded in terms of Portfolios would provide the most logical and fruitful approach. The use of portfolios to describe and evaluate CSREES work, therefore, is new and required a broader, more integrated perspective than Deputy Administrators and National Program Leaders (NPLs) had previously employed. These self-review papers are the first time that packages of Agency work have been conceived, described, and evaluated using a portfolio/ Knowledge Area (KA) component approach. Therefore, although some component program-oriented performance measures may be available, other portfolio and KA-focused measures may be new and not yet available for analysis. Initiatives are already underway to improve data availability for portfolio review.

In the self review document each KA discussion is composed of research, education, and extension activities across various units within CSREES. A specific program, often conducted by a single program unit or even a single National Program Leader, may address several Knowledge Areas and several objectives of the CSREES Strategic Plan. Descriptions of these areas do not cover all the activities within a portfolio. Additional information can be found in the Evidentiary Material available. The NIFA website (<http://www.nifa.usda.gov>) also contains information on all Portfolio's programs.

CSREES-sponsored research, education and extension work is funded from multiple authorizations and funding sources. To fully appreciate this integrated, mission-focused work, portfolios of topically-linked issues are aligned, as was stated earlier, with the five USDA Strategic Goals, and 14 CSREES Strategic Objectives. The portfolios, and their related KAs, demonstrate the complementary nature of research, education and extension that is integrated to solve national problems, and to ensure that the public investment is effective and efficient. This review format also allows for a more comprehensive application of the review criteria of relevance, quality and performance. A full description of the strategic goals, objectives, and portfolios, and the KA Classification for Research, Education, and Extension are included in the Evidentiary Materials.

Portfolio Review Support Functions

The CSREES Office of the Administrator (P&A) designed the portfolio review process and guides a systematic, standardized, transparent review process across all portfolios and programs of the agency. In order to obtain OMB approval for these panels, a structured process for rating each portfolio has been designed. The Office of the Administrator (P&A) provides facilitation of the effort to prepare documentation and to manage panels convened by the Administrator. Program staff (NPLs) and senior managers participate by:

- Recommending to the Administrator names of panelists of sufficient experience and breadth of view to allow them to assess large, complex portfolios of combined research, education, and extension work integrated to meet strategic objectives.
- Writing, in coordination with National Planning and Accountability Leaders (NPALs) who served as facilitators and with IPAs from partner universities, self-review papers (i.e., this document) that thoroughly addressed the key issues/problems/needs that the portfolio and its component problem areas addressed, the resources devoted (inputs), the activities (outputs), and results (outcomes), and the resulting relevance, quality, and performance of the portfolio.

- Preparing documentary evidence in coordination with NPAL facilitators to accompany and support the self review paper with evidence that best meets standards of evaluation science. The evidence and paper describe the accomplishments, needed work, and steps planned for the next five years until an external review panel is again convened.
- Presenting a brief overview of the portfolio and addressing inquiries of panelists during the review hosted by the P&A unit of the Office of the Administrator.
- Receiving and responding to the recommendations made by the panel regarding ways the portfolio can better meet its objectives and goals, and thereby further the mission of the agency.
- Meeting annually between external panels to update the portfolio, address PREP recommendations, and review and rate the portfolio outcomes for annual submissions to OMB (in lieu of holding external panels every year).

The panel, hosted by the Office of the Administrator and staffed by P&A NPALs and the partner IPA who assisted NPLs in writing the self review paper, meets in Washington, D.C. for 2 ½ days. Support is provided in note taking, provision of further analyses or documentation, and the production of the draft panel report of recommendations. The panel reviews the draft report, revising and finalizing it on the final day of the meeting. The panel then also provides oral feedback to the Associate Administrator, Deputy Administrators, and NPLs as the last step of its meeting in Washington.

Expert Panel Functions

During the review process, the external Portfolio Review Expert Panel is asked to:

- Read this self-review document prior to arrival
- Peruse accompanying reference support evidentiary materials as desired when in Washington for the panel meeting
- Request additional support information as panelists deem necessary
- Hear a brief overview presentation on the portfolio by subject matter experts (Deputy Administrator and NPLs) on the first day of the panel meeting
- Participate in a question-and-answer opportunity for clarification of issues during the overview presentations
- Discuss the relevance, quality, and performance of the portfolio, based on the material presented, during the panel meeting
- Rate the portfolio on the OMB criteria using a scoring tool that will be provided
- Provide feedback to the CSREES Administrator and program managers on what achievements have been made, as well as recommendations for improvement in reaching portfolio goals.

How CSREES, in General, Meets the OMB Criteria of Relevance, Quality, and Performance

The main purpose of this self-review document is to prepare panelists for the portfolio review process in which they will rate the relevance, quality, and performance of CSREES efforts to meet strategic objectives through complex, integrated research, education, and extension efforts. The following explanation provides insights into how the Agency excels in each dimension of the three OMB criteria by the general structure of its work. Section IV of this report provides a specific discussion of these dimensions as related to this portfolio.

Relevance

NPLs are the critical links to CSREES partners and constituents (including researchers, educators, extension specialists, experiment stations, industry, groups, commodity organizations, consumer groups, advocacy organizations, advisory committees, review panels, national academies, scientific and professional societies, federal agencies, White House Office of Science and Technology Policy, and Congress). Feedback from these groups and individuals is obtained directly and indirectly and is used to identify and prioritize national needs to assure the relevance of programs within each portfolio. (See Evidentiary Materials)

Both formal and informal procedures are used to obtain stakeholder input. These may include stakeholder workshops, symposia, technical reviews, peer panel recommendation, white papers, CSREES departmental review reports, presidential directives, interagency working groups, strategic plans for research and development, regulatory policies impacting food quality and safety and industry plans and priorities. In addition, every Request for Applications (RFA) specifically seeks stakeholder input as per requirements of the Agricultural Research, Extension, and Education Reform Act of 1998 (AREERA) (7 U.S.C. 7613(c)(2)). This section requires the Secretary to solicit and consider input on a current RFA from persons who conduct or use agricultural research, education and extension for use in formulating future RFAs for competitive programs. These processes and networks help the agency ensure the relevancy of programs relative to local, state, regional and national needs. Priorities are generated through aggregation of problems and issues identified at the local, state, and national level.

All the programs managed by CSREES use relevance and quality as criteria for pre-award evaluation of projects. Relevancy is established by taking into consideration the industry and/or consumer needs and priorities. The quality is assessed based on the scientific merit, proposed procedure, and programs potential to succeed.

The portfolios being reviewed are dynamic and change periodically to address emerging national needs consistent with cutting edge science. Program descriptions, program reports, and RFAs included in the Evidentiary Materials section of this document demonstrate the dynamic nature of the portfolios.

Scope

The scope of a portfolio is reflected in the funds invested, and the number of projects and programs involved. Most portfolio work encompasses the programs of state agricultural experiment stations (SAES), 1862, 1890, and 1994 land grant institutions, Hispanic-Serving Institutions (HSIs), other cooperating institutions including state and private colleges and universities and USDA intramural agencies. These programs are closely linked to the teaching and extension activities of the land-grant universities and other institutions. At the university level, research programs are integral to graduate education, through which budding scientists are prepared to address future scientific challenges. Because CSREES partners with a unique collaboration of federal, private and public sector stakeholders to address national issues, coordination, joint planning and priority setting are accomplished through various national and regional mechanisms so that the efficient use of resources can be ensured.

CSREES portfolios usually employ a creative combination of funding mechanisms, including formula funds, the NRI, and special grants. Investments from other Federal and state agencies and states may be reflected as well demonstrating that the leveraging of funds and sharing of resources is critical to maximizing outcomes.

CSREES Science and Education Resources Development (SERD) is leading USDA's commitment to human capital development. It is important to note that the funds reported in this document (except as

noted) represent investments on research activities and do not include extension activities. The agency is currently addressing this issue, including modification of the Current Research Information System (CRIS) database, so that this information for education and extension activities will be readily accessible within the next 5 years.

The summaries presented on the pages that follow are based on federal and state research activity as documented in USDA CRIS, land-grant university plans of work, the USDA Science and Education Impact database (see <https://nifa.usda.gov/efnep-national-data-reports>), and the databases and records of NPLs.

Focus

CSREES peer review of formula-funded research proposals and competitive grant proposals and similar review of state Cooperative Extension plans of work and annual reports ensure that programs and activities supported by CSREES funds focus on critical scientific issues. National planning activities and listening sessions help to guide state and regional level research, education and extension programming to contribute to meeting national needs. The competitive review process encourages innovative ideas that are likely to open new research approaches to enhancing agricultural and natural resource management. A proven mechanism for stimulating new scientific research, the process increases the likelihood that investigations addressing important, relevant topics using well-designed and well-organized experimental plans will be funded. Each year, panels of scientific peers meet to evaluate and recommend proposals based on scientific merit, investigator qualifications, and relevance of the proposed research to the mission and goals of USDA.

For this report, priorities are based on USDA CSREES Strategic Plan. In addition, priorities and emerging issues are identified through the broad network of relationships that Deputy Administrators and NPLs have established. A number of themes are outlined in the KA descriptions (Section III) that illustrate where CSREES is contributing to timely, relevant research directed at solving critical problems of national significance.

Emerging Issues

Setting priorities is an important mechanism for facilitating the scientific and technological advances needed to meet the challenges facing U.S. agriculture and natural resources management. Congress sets the budgetary framework by providing funds to CSREES. Members of Congress also make recommendations for the scientific and programmatic administration through appropriation language and through their questions and comments during Congressional hearings. Input into the priority-setting process is sought from a variety of customers and stakeholders. In 1998 AREERA formally required that formula-funded projects reflect stakeholder priorities. The scientific community provides direction through the competitive grant proposals it submits each year as well as through the proposal evaluation and funding recommendations of individual peer-review panels.

Participation by NPLs in review panels for competitive programs, federal interagency working groups, and stakeholder listening sessions are important in helping CSREES identify emerging issues. NPLs also attend professional and scientific meetings to remain current on scientific trends so that they are better able to identify those trends that should be reflected in CSREES programs and in the coordination of priority setting with other federal agencies. The Administrator and NPLs have established close working relationships with various stakeholder partners including research, education and extension scientists and educators at the universities and colleges, other federal agencies, county agents and educators, advocacy organizations, professional societies, advisory groups, environmental groups and Congress. Through such meetings, NPLs learn of stakeholders' current priorities, and solicit suggestions on ways CSREES can assist in meeting their needs. Through these interactions, emerging issues are identified.

Integration

Integration refers to the linkage of the several CSREES missions of research, education, and extension in programs and activities to produce products which reach a wide variety of audiences or stakeholders in appropriate formats. These products might otherwise be disjointed or more narrowly defined. CSREES is dedicated to integrated efforts in all its programming areas. However, some challenges caused chiefly by outside factors are beyond CSREES control. For example, some legislative authorizations are so specifically defined that they preclude meaningful integration. Similarly, some CSREES stakeholders have interests which are fixed on singular purposes. Such situations require NPLs to take the initiative and stimulate integration in otherwise focused program areas.

While integration issues have been somewhat problematic in the past, significant progress has been made. CSREES also now has competitive grant programs that specifically require or encourage integrated programming. The National Research Initiative (NRI), is one of these programs and is authorized to allocate up to 20 percent of its annual funding for integrated projects. Additionally, some programs can now allocate funds to projects that integrate research and education activities.

Long-term outcomes of the portfolios can best be achieved through strong research, education and extension programs that are integrated. While the portfolios present a complex system in terms of funding and integration of programs, there is a critical need to develop new models and delivery systems that are effective and performance-based. NPLs direct, apply and adopt applied, research-based knowledge in innovative ways. They will continue to enhance their leadership in the delivery of research-based knowledge through extension, outreach and information dissemination in order to strengthen the capacity of public and private policy-makers.

Multidisciplinary Balance

Both mission-linked and fundamental research is supported by CSREES (formula and competitive) funds. Mission-linked research targets specific problems, needs, or opportunities. Fundamental research involves the quest for new knowledge about important organisms, processes, systems, or products. It opens new directions for mission-linked research. Both are essential to the sustainability of agriculture. Review of formula-funded projects reveals that the vast majority typically combine both fundamental and mission linked approaches. Although single-investigator projects remain the norm, increasingly research projects are conducted in multidisciplinary and multi-investigator formats. Additionally, CSREES competitive grant programs are encouraging multidisciplinary research. Moreover, CSREES requires that 20 percent of the research formula funding it provides to states be devoted to multi-state activities, which indirectly promotes multidisciplinary approaches. In turn, the regional agriculture experiment station systems use the funds to support multi-state research projects and committees. Several such projects have objectives related to the portfolio of interest and CSREES NPLs serve as advisors to them.

From the extension perspective, multidisciplinary approaches, and involvement of end-users in the conduct of research experiments are well established practices in many states. This is especially true for multi-state research projects, where producers and other end-users are integrally involved in the projects. Additionally, some competitively funded programs require integration of research, education and extension in all funded projects. Specific examples of integrated projects and their outcomes are discussed in the KA sections of the portfolio.

Interdisciplinary Integration

CSREES supports strong program and disciplinary linkages within the portfolio team, throughout the agency, and with other government agencies. A strong university-based research, education and extension system, linked to the various USDA agencies, other federal departments, and the private sector, moves CSREES towards an integrated, sustainable system of resource management.

Quality

Significance of Research Findings

At the Agency level, all federal funds are leveraged by a ratio of at least \$2 of non-federal funds for every \$1 of federal funding. This leveraging provides expanded fiscal resources to address programs that are partially funded by CSREES.

CSREES, through its partnership with universities, other federal and state agencies, and private organizations, is contributing to a bank of science-based knowledge through research, education and extension activities. Included in this report are examples of some of the thousands of CSREES-funded projects that are having significant positive impacts on agency and Portfolio priorities.

Research activities are geared towards the needs of CSREES' stakeholders and the science-based knowledge that results from these activities is used by policy-decision makers and others to positively impact the health and well-being of society.

Methodological Rigor

All proposals submitted to CSREES must undergo a rigorous review process at several levels. Competitively-funded projects are reviewed by an external peer panel of experts drawn from universities, other federal and state partners, and the private sector. Non-competitively funded proposals, including formula funds, are reviewed at the university level prior to submission to CSREES, where they are further reviewed by NPLs. NPLs ensure that the proposed projects keep with the mission of the agency, fit the intent of relevant legislative acts, and that potential outcomes and impacts are measurable. Proposals submitted for congressionally-directed funding are also reviewed by NPLs, who subsequently schedule site visits to monitor the progress of these projects. Similarly, NPLs serve as liaisons to all multi-state projects for reasons previously discussed.

Outputs and Outcomes

Outputs of CSREES-funded activities include but are not limited to publications, development of guidelines and guidebooks, training manuals, curricula and courses, trained scholars, new methodologies and techniques, models and management strategies to improve the nation's nutrition and health. These outputs lead to short- medium- and long-term outcomes. CSREES-funded activities must demonstrate they will result in measurable impacts which require outputs, outcomes and impacts to be integrally connected. Proposals submitted for funding are assessed for these criteria as a measure of quality. The result, when viewed nationally, is a diverse portfolio of programs with different goals and objectives, addressing long-term impacts aligned with the portfolio objectives.

Stakeholder/Constituent Input

Formula fund (Hatch, Evans-Allen, McIntire-Stennis and Smith Lever) are required by AREERA to obtain stakeholder input every year and to describe the process used to identify individuals or groups as stakeholders. Also, each institution is required to demonstrate how these inputs relate to Plans of Work (POW), priority setting, immediate needs, long-term goals, guidance on monitoring, and proposed research activities.

CSREES and the Agricultural Research Service (ARS), the USDA in-house research component, conduct a number of stakeholder listening sessions in order to assess program effectiveness and to identify new and emerging issues. NPLs from both agencies participate in these listening sessions, thereby reducing the redundancy of programming.

Alignment with Current Science

All funded projects complement the CSREES portfolio goals. The outcomes and accomplishments of funded projects could not be achieved without application of modern and advanced science methodologies and techniques.

Performance

Assessment of the performance of the programs funded in this portfolio suggests that the programs are providing science-based knowledge and education to meet portfolio goals.

Portfolio Productivity

Each KA demonstrates various research, education and extension accomplishments. Assessing the productivity of competitively funded programs, including education, is relatively straightforward in that project directors are required to submit annual and termination reports. In addition, NPLs routinely schedule site visits to assess the progress of projects receiving congressionally-directed funds. The assessment is more difficult, however, with formula programs, particularly extension, because states have traditionally exercised wide latitude in what they report to CSREES in their POW and annual reports. The new electronic web-based state POW reporting system now under construction will require reporting plans and outcomes via a logic model and this will help streamline the process to some degree. However, because CSREES contributes a small percentage of the total funds in some states, State annual POW reports will still vary from state to state, with some filing detailed and comprehensive reports, and some reporting on relatively few programs. The result is, at the present time at the national level, a very mixed and incomplete picture of the results that emerge from CSREES-funded programs.

Portfolio Comprehensiveness

Programs meet their intended outcomes at both the individual project level and at state and institution levels where guidelines and directions are provided to states through formula funds. Details are provided in the KA discussions that demonstrate accomplishments are being achieved. Timely reviews and feedback from NPL-directed project reviews ensure proposed objectives are being addressed and that proposed objectives are aligned with potential outcomes and impacts.

Portfolio Timeliness

Assessing the timeliness of the work in a portfolio is largely done by monitoring the submission of final reports or requests for renewal, extension, or budget carryovers. These determinations are relatively easy to track for competitive grants and special grant projects that require submission of formal proposals, and annual and termination reports. Assessing the timeliness of the work accomplished through formula programs, particularly extension programs, has inherent challenges. Research projects have discreet start and completion dates, but extension programs may have semi-discreet start and completion dates because of the nature of education, which is rarely “completed.” For example, because there is continual turnover in the extension audiences, the “timeliness” criterion is harder to assess. What can be assessed, in place of timeliness, is extension program evolution. As issues change and new knowledge is gained, extension programs are continually evolving in order to incorporate new considerations. This is monitored, in part, through the state Annual Reports which are reviewed by NPLs.

Agency Guidance

The agency provides guidance (examples of the various forms of agency guidance are contained in the Evidentiary Materials) in the conduct and assessment of programs through several mechanisms:

- RFAs - Project Directors of funded projects are expected to fulfill the project objectives and to submit annual progress and termination reports, which are logged into the CRIS database. The

requirements that must be fulfilled by the Project Director are clearly spelled out in the Terms and Conditions of the award document sent to the performing institution. NPLs, if needed, are also available to provide timely answers to the Project Directors on an individual basis. In this way, CSREES ensures that funding recipients clearly understand their obligations.

- NPL Management and Leadership - NPLs are responsible for portfolios of work within specific disciplines, funding sources and functions. NPLs interact with multi-state research committees, ad hoc program committees, strategic planning efforts and other venues with the university community. Part of this interaction involves conveying agency needs and expectations regarding the provided funding. This is usually more relevant to formula-funded programs, as competitive grant recipients have formal obligations to complete the project objectives for which they were funded.

Portfolio Accountability

The work accomplished in portfolios is monitored by NPLs who are either program directors for competitive grant programs, agency contacts for special grants, or state annual report reviewers. The CRIS system is an informational resource that allows NPLs to track the progress of research and, more recently, education programs. The CRIS database is accessed by NPLs to determine if projects were completed as funded, if requests for extensions and budget carryovers are justified, and if progress reports were submitted prior to approving requests for renewals. Extension formula-funded programs submitted as POW annual reports, are evaluated on a state-by-state basis by a two-member NPL Review Team. These reports are evaluated for completeness, evidence of impacts, and stakeholder involvement. A written assessment is completed and returned to each institution. In the event that a report has deficiencies, the lead NPL communicates those deficiencies to the extension director, and awaits additional documentation before proceeding with the review. The review is completed upon receipt of a satisfactory report.

CSREES is in the process of designing new processes and tools, particularly monitoring and evaluation systems, and will train agency partners in their use. In an environment in which funding is increasingly difficult to obtain, any activity that strengthens accountability and impacts will likely have greater funding support.

Background on CSREES and its Funding Authorities

This report was developed by nutritionists in the Families, 4-H and Nutrition unit and the Competitive Programs unit, CSREES, USDA. It is submitted to the Portfolio Review Panel, which is convened by the CSREES Administrator, to assess the effectiveness of the Nutrition Team as it leads efforts to address national problems and/or issues related to nutrition. The report covers a wide variety of programs conducted from 2000–2004 that are related to CSREES Strategic Goal 4, and Objectives 4.1 and 4.2.

The first part of the report contains a general description of CSREES, its vision, mission, functions, and funding authorities. The second part is a description of the KAs addressed in this portfolio including:

- KA 701 – Nutrient Composition of Food
- KA 702 – Requirements and Function of Nutrients and Other Food Components
- KA 703 - Nutrition Education and Behavior
- KA 704 – Nutrition and Hunger in the Population

Each KA discussion is composed of research, education, and extension activities across various units within CSREES. A specific program, often conducted by a single program unit or even a single NPL, may address several KAs and several objectives of the CSREES Strategic Plan. Write-ups on these areas are compressed and do not cover all the activities within a portfolio. Additional information can be found in the Evidentiary Material that will be available at CSREES review. The CSREES website The NIFA website (<http://www.nifa.usda.gov>) also contains information on this portfolio's programs.

During the portfolio review meetings, National Program Leaders (NPL's) with responsibility for each Knowledge Area will provide the Panel with a brief presentation of the highlights of their KA. They will then be available for clarification and discussion should the Panel have further questions. It is CSREES' expectation that Review Panel members will:

- (1) Study this report before meeting in Washington, DC
- (2) Ask the NPL's questions for clarifications during or after their presentations
- (3) Assess and score the 2000-2004 portfolio on the basis of criteria developed by OMB for Relevance, Quality and Performance, using a scoring tool that will be provided
- (4) Make recommendations to the CSREES Administrator and NPLs for improving the portfolios' performance

United States Department of Agriculture (USDA)

The mission of the United States Department of Agriculture (USDA) is to provide leadership on food, agriculture, natural resources and related issues based on sound public policy, the best available science and efficient management. USDA's vision is to be recognized as a dynamic organization that is able to efficiently provide the integrated program delivery needed to lead a rapidly evolving food and agriculture system.

Cooperative State Research, Education, and Extension Service (CSREES)

The Cooperative State Research, Education and Extension Service (CSREES) role is to generate and disseminate knowledge via extramural research and education in support of the USDA mission. CSREES is USDA's primary link with the land-grant university system and with other higher education institutions. CSREES invests public funds, as authorized and appropriated by the Congress, in basic, applied, and developmental research, extension, and teaching activities in food and fiber, agriculture, renewable natural resources, forestry, and the physical and social sciences. Through the distribution and management of formula funds, competitive grants, and special grants, CSREES achieves its mission to advance knowledge for agriculture, the environment, human health and well being, and communities. Specifically, CSREES provides national program leadership to identify, develop, and manage programs to support land grant university-based and other institutional research, education, and extension, and provides fair, effective, and efficient administration of federal assistance implementing research, education and extension awards and agreements. Figure 2 provides an overview of the structure of the agency offices and units.

Vision

Agriculture is a knowledge-based, global enterprise, sustained by the innovation of scientists and educators.

Mission

To advance knowledge for agriculture, the environment, human health and well being, and communities.

Functions

Program leadership to identify, develop, and manage programs that support university-based and other institutional research, education, and extension. Fair, effective, and efficient administration of federal assistance in implementing research, education, and extension awards and agreements.

(See evidentiary material for the CSREES Strategic Plan)

Figure 2: Organizational Structure of CSREES



Using Portfolios and Knowledge Areas to Address Issues

CSREES-sponsored research, education and extension work is funded from multiple authorizations and funding sources. A full description of the strategic goals, objectives, and portfolios, and the Problem Area Classification for Research, Education, and Extension are included in the Evidence Volume.

CSREES Reviews of Land-Grant Plant and Animal Programs

One of the educational efforts in which CSREES engages is reviewing various college/department/school nutrition related programs at land grant institutions. When program review requests are submitted to the agency by land grant university partners, CSREES Deputy Administrators assign the appropriate NPL to lead a review team generally comprised of faculty from other institutions and USDA personnel who have expertise in the program slated for review. The review encompasses research, education (undergraduate and graduate programs) and extension activities as they relate to the particular program. The review team reviews a self study document prepared by the institution and typically spends approximately four days on site interviewing and listening to presentations by administrators, faculty, staff, students, and stakeholders. The review team subsequently prepares a comprehensive report documenting the strengths and weaknesses of the programs and also identifies opportunities for improving the program. This process allows the agency to gain a better insight into and to influence research, education and extension programs at land grant institutions. In addition, by having their programs reviewed from a national perspective, institutions are better able to ensure their programs are consistent with those of their peers.

The Role and Authority of a National Program Leader (NPL)

National Program Leaders (NPLs) and other program managers in CSREES are empowered to carry out the mission of CSREES - to advance knowledge for agriculture, the environment, human health and well-being, and communities. To accomplish this mission, these senior staff members perform critical tasks under the authority of the CSREES Administrator and report to CSREES Deputy Administrators. These tasks fall into four general categories:

- Network and collaborate with partners and stakeholders to identify mission-relevant problems, opportunities, and issues requiring Federal attention and support
- Conceive, formulate, and direct programs and activities to respond to existing or emerging problems, opportunities, and issues through the development and application of science-based knowledge
- Administer and manage programs and activities to develop and apply science and knowledge
- Evaluate and assess the quality, outcomes, and impacts of these programs

Figure 3 provides an overview of responsibilities under various types of funding.

Figure 3: National Program Leaders Activities in CSREES Program Categories

Program Category	Examples of Program Leadership
Formula Funding	
Formula Research*	National program planning & oversight, multi-state/multi-discipline coordination & facilitation, national priority setting, national symposia, project review
Formula (Smith Lever) Extension	National program planning & oversight, multi-state/multi-discipline coordination & facilitation, national priority setting, national symposia, plans of work review
Special Grants	
Special Grants - research	Overall programmatic oversight, grant management, national/regional coordination
Other Research	Overall programmatic oversight, grant management, national/regional coordination
Smith-Lever 3(d) Extension	Overall programmatic oversight, grant management, national/regional coordination
Other Extension	Overall programmatic oversight, grant management, national/regional coordination
Competitive Grants	
National Research Initiative	RFA development, panel management, national priority setting, national symposia
Integrated Activities (406)**	RFA development, panel management, national priority setting, national symposia, grant management
Higher Education	RFA development, panel management, national priority setting, national symposia, grant management
* Includes Hatch Act, McIntire-Stennis Cooperative Forestry, Evans-Allen Program, and Animal Health and Disease Section 1433.	
** Includes water quality, food safety, and pest management programs.	

NPALs in the P&A Unit of the Office of the Administrator, focus specifically on strategic planning for the Agency and on conducting and guiding evaluations of the portfolios and their program components. NPALs host and staff the PREPs, facilitate the writing of self-review papers, write the Agency PART, provide accountability support for the BPI and budget justifications, obtain POW/Annual Report data, coordinate with Information Technology (IT) on databases, and serve Agency Partners.

Current Trends and Opportunities

The land-grant university system was established by the Morrill Act of 1862 “to teach such branches of learning as are related to agriculture and the mechanic arts . . . in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.” At that time, the scientific basis of agriculture was rudimentary and focused primarily on increasing agricultural productivity. Plant and animal breeding, nutrient management and mechanization of agriculture are significant milestones in the spectrum of scientific investment in agricultural productivity.

As agriculture matured and became more fully integrated into the social, political and economic structure of the nation, broader issues, including positive and negative environmental and economic externalities, access to and the distribution of the benefits of public investment in agriculture and rural communities, and the sustainability of the scientific workforce have emerged. Breakthroughs in fundamental science, including genomics, microbiology and nanotechnology have raised the bar for the application of science, technology, and practice in producing, processing, marketing and distributing food and fiber products. These sometimes produced additional questions regarding long term risks and benefits, ethics, and domestic and international consumer acceptance. In the post-9/11 environment, the aggregate safety and security of the food and fiber supply, terrorism aimed at food and fiber products, and protecting public health and well being has become paramount.

In order for U.S. agriculture to compete in today's global market, a number of production, economic, and policy issues must be addressed by research, education, and extension. Continued advances in biotechnology, precision farming, disease epidemiology, and animal and human nutrition will improve agricultural production efficiency and the quality of agricultural products. The complexity of public policy decisions, as influenced by divergent societal values, economic forces, changing demographics and natural resource sustainability, will be addressed through consensus-building forums. The development of new food and nonfood products such as fuel, paint, plastics, pharmaceuticals and nutraceuticals from agricultural or other bio-based materials will expand the market for agricultural commodities. Some have the potential to minimize our dependence on foreign oil. Better understanding of global markets and improved business and marketing practices can help firms be more successful. Domestic and international policy analysis will identify existing policies that are impediments to trade and development, and find alternatives.

“The Partnership,” Stakeholders, and Customers

Integral to the CSREES mission, and its ability to carry on that mission, is the notion of partnerships. CSREES is the federal partner in a vast network of thousands of scientists, educators, and extension staff and volunteers, who carry out its programs throughout the United States, its territories, and beyond. Most of these partners work at or through land-grant universities. This special relationship is known as “The Partnership”. There are one or more land-grant institutions in each U.S. state and territory and in the District of Columbia. These partnerships demonstrate the linkages and interdependency between the federal and state components of a broad-based, national agricultural research, extension, and higher education system.

Starting in 1862, the federal government granted federally owned land (hence the name “land-grant”) to each state for the development of a university that would serve the citizens of the state in the areas of research, education and extension. Other land-grant universities were designated in 1890 (historically black universities and land-grant colleges) and in 1994 (American Indian/Alaska Native tribal colleges). In 1996 USDA also began partnering with HSIs to provide support for a growing Hispanic population in the US.

While nearly all universities have research and education as their core responsibilities, land-grant universities also have a federal government-mandated extension (outreach) responsibility. “Extension” is defined as “non-formal adult and youth education programs that translate and transfer research findings that can be applied to real-life situations”. This means they are directed by law to offer to the public noncredit, tax-supported educational programs and information based on the results of university research. The role of the university system is critical to assure relevance, quality, and performance for the

programs administered and led by the agency. CSREES program leadership serves as both the catalyst and focal point for national research, extension and education programs dealing with agriculture, the environment, human health and well-being, and communities. The wide-ranging CSREES land-grant partnership includes:

- More than 130 colleges of agriculture
- 59 agriculture and natural resource experiment stations
- 57 cooperative extension services
- 65 McIntire-Stennis Cooperative Forestry Research institutions
- 20 historically black colleges and universities
- 27 colleges of veterinary medicine
- 42 schools and colleges of family and consumer sciences
- 33 Native American land-grant institutions
- 17 Alaskan native-serving and Hawaiian native-serving institutions
- More than 240 Hispanic-serving institutions
- 5 regional aquaculture centers

The scope of partner activities is broad. They include: all aspects of agriculture; natural resource conservation and environmental quality; plant and animal production, protection, and health; processing, distribution, safety, marketing, and utilization of food and agricultural products; forestry (including urban and agroforestry), fisheries, wildlife and range sciences; aquaculture; family and consumer sciences; human nutrition; rural, community, and economic development; sustainable agriculture; molecular biology; and biotechnology.

CSREES' ultimate customers are citizens. CSREES works with land-grant universities, other institutions and industry to create and transfer the know-how and the technology from the laboratory to farmers, ranchers, consumers, and agribusiness. The Cooperative Extension System, through state and county extension offices, provides information to every county in the nation, offering extension education that links research, science and technology to people where they live and work. Topics range from community development, health care, food safety, water quality, sustainable agriculture, and the environment to programs for children, youth, and families.

The main extramural research and education partnership for CSREES exists with the Land Grant universities. Funding from CSREES supports research, extension, and education programs at these institutions. Where the funding is provided based on a formula-based allocation, CSREES does not dictate specific program goals and objectives, but relies on NPLs to convey the mission and goals and objectives of the Agency and relies on the original authorizing legislation to reflect that mission. This allows stakeholders at the state and local levels to determine their greatest research and extension needs, thereby solving national problems at the local and regional level. Where funding is provided through competitive grants announced via the Requests for Applications (RFAs) written by NPLs who focus work to meet Agency goals, institutions are required to pursue the program of work which they proposed and for which they received funding.

Funding Authorities for CSREES Activities

CSREES programs increase and provide access to scientific knowledge; strengthen the capabilities of land-grant and other institutions in research, extension and higher education; increase access to and use of improved communication and network systems; and promote informed decision making by producers,

families, communities, and other customers. CSREES supports research, education and extension at partner institutions mainly through three funding mechanisms: 1) formula funds, 2) competitive grants and 3) special grants.

Formula Funds

CSREES provides funds for research and extension to land grant institutions (1862, 1890 and 1994 institutions) and schools of forestry and veterinary medicine through several formula grant authorities. The amount of funds provided to each institution is determined through a statutory formula which may include such things as the rural population or amount of farmed acreage in a state. Formula funds are a critical source for base support of agricultural programs at the land-grant institutions. Combined with matching funds from state and local governments, these funds form the foundation for activities ranging from animal and crop improvement, watershed management, 4-H programs and nutrition education. Decisions about how the funds are spent are determined on a local and regional basis. Institutions receiving Hatch and Smith-Lever formula funds and the 1890 Institutions receiving research and extension formula funds must submit five-year plans of work describing the use of the funds and must document the process used to solicit stakeholder input used to set priorities for the use of Federal research and extension funds.

Competitive Grants

Competitive programs enable CSREES to attract a large pool of applicants to work on agricultural issues of national interest, and to select the highest quality proposals submitted by the most qualified individuals. CSREES uses the competitive grant processes for fundamental or applied research, for extension, for higher education, and for programs which integrate research, education and extension functions. Grants are awarded through a rigorous peer-review process. Eligibility, administrative rules, and procedures may vary for each program depending on authority derived from the Farm Bill or appropriation law. Special competitive programs are available that are tailored to increase participation of minority or small and mid-sized institutions in research, education or extension. Other competitive grants are more broadly open to all applicants or to specific types of applicant institutions. The number of competitive programs administered by CSREES has increased in recent fiscal years with the addition of the Integrated Research, Education and Extension Grant Programs.

Special Grants (Congressionally-directed projects)

Earmarked projects are those defined specifically by Congress to support a designated institution or set of institutions for particular topics in research, education or extension. Earmarks serve the purpose of directing funds to local or state issues that are of high specificity to the locality. These grants, numbering in the several dozen and not a component of the Administration's overall agenda, will not be discussed further in this document.

In this section each type of funding is profiled along with the legislation that established the authorization and funding. For those seeking further detail, an appendix to this section begins on page 30. In that supplement more in depth profiles of the various acts, legislation and funding lines are provided. It is important to note that while these funding allocations are listed under discrete headings (e.g. Research and Education Activities, Integrated Activities, Extension Activities, etc.) there are instances where the enabling legislation allows for a variety of program implementation scenarios. For example, under both Hatch and Smith-Lever there are multi-state projects that are similarly constructed to integrated efforts. The Sustainable Agriculture Research and Education program also provides funding for projects that combine research, extension and education.

Research and Education Activities

Research and Education programs administered by CSREES are USDA's principal connection to the land grant university system of the U.S. for the purpose of conducting agricultural research and education programs. USDA participates with state and other cooperators to encourage and assist the state institutions in the conduct of agricultural research and education through the State Agricultural Experiment Stations (SAES) of the 50 states and the territories; by approved Schools of Forestry; the 1890 Land-Grant Institutions, Tuskegee University and West Virginia State College; Colleges of Veterinary Medicine; and other eligible institutions. Appropriations for research and education activities are authorized under the following Acts: (these are detailed in Appendix A)

Formula Programs in this area include:

- *Hatch Act*
- *McIntire-Stennis Cooperative Forestry*
- *Evans-Allen Program (1890 Colleges, Tuskegee University, and West Virginia State College)*
- *Animal Health and Disease Program*

National Research Initiative (NRI) Competitive Grants

Section 2(b), Act of August 4, 1965, 7 U.S.C. 450i(b), as amended, authorizes Competitive Research Grants for periods not to exceed five years to SAES, all colleges and universities, other research institutions and organizations, Federal agencies, private organizations or corporations, and individuals to further the programs of the Department. The NRI supports research, education, and extension grants that address key problems of national, regional, and multi-state importance in sustaining all components of agriculture (farming, ranching, forestry including urban and agro-forestry, aquaculture, rural communities, human nutrition, processing and others). Such integrated projects hold the greatest potential to produce and transfer knowledge directly to end users. Further detail is provided in Appendix A.

Special Research Grants

Section 2(c), Act of August 4, 1965, 7 U.S.C. 450i (c), as amended, authorizes Special Research Grants for periods not to exceed three years to SAES, all colleges and universities, other research institutions and organizations, federal agencies, private organizations or corporations, and individuals. Previously, grants were made available for the purpose of conducting research to facilitate or expand promising breakthroughs in areas of the food and agricultural sciences. However, the Agricultural Research, Extension, and Education Reform Act of 1998 expanded the purposes under this authority to include extension or education activities. Grants funded in this account are only for research projects. Special Research Grants are awarded on a discretionary basis as well as through the use of competitive scientific peer and merit review processes. These grants are discussed further in Appendix A.

Other Research (these are detailed in Appendix A)

- *Critical Agricultural Materials*
- *Aquaculture Centers*
- *Sustainable Agriculture Research and Education Program (SARE)*
- *Supplemental and Alternative Crops*

- *1994 Institution Research Grants*
- *Federal Administration (direct appropriation)*
- *Small Business Innovation Research Program (SBIR)*
- *Biotechnology Risk Assessment Research Competitive Grant Program*

Higher Education

CSREES' SERD is leading USDA's commitment to human capital development. SERD's grant programs strengthen agricultural and science literacy in K-12 education, influence students' career choices toward agriculture, strengthen higher education in the food and agricultural sciences, prepare graduate students, and train master's and doctoral-level students as future scientists. SERD also provides national leadership for revitalizing curricula, recruiting and retaining new faculty, expanding faculty competencies, using new technologies to improve instruction delivery, attracting outside scholars, developing research and teaching capacity at minority-serving institutions, and increasing the diversity of the food and agricultural scientific work force. The following grant programs support our efforts. Further detail regarding each of the grant programs is provided in Appendix A.

- *Graduate Fellowship Grants*
- *Institution Challenge Grants*
- *1890 Institution Capacity Building Grants*
- *Multicultural Scholars*
- *Hispanic-Serving Institutions Education Grants Program*
- *Tribal Colleges Education Equity Grants Program*
- *Tribal Colleges Endowment Fund*
- *Secondary/2-Year Post Secondary*
- *Alaska Native-Serving and Native Hawaiian-Serving Institutions*

Outreach and Assistance for Disadvantaged Farmers Activities

Section 2501 Legislative Authority

Outreach and Technical Assistance for Socially Disadvantaged Farmers and Ranchers Program

The authority for this program is contained in Section 2501(e) of the Food, Agriculture, Conservation, and Trade Act of 1990.

This program provides outreach and technical assistance to encourage and assist socially disadvantaged farmers and ranchers to own and operate farms and ranches and to participate in agricultural programs. CSREES assumed the responsibility for the grant making aspects of this program beginning in FY2003. Competitive grant awards are made for multiple year projects.

Integrated Activities

Competitive grant programs offering support for integrated research, education, and extension activities are uniquely positioned to effectively develop and implement solutions to important agricultural problems. They do this by funding applied research on specific problems and issues, and transferring the

resulting knowledge to end users via classroom education or informal extension and outreach. Within CSREES, integrated multi-functional projects are supported primarily through two competitive grants programs, the Integrated Research, Education, and Extension (from Section 406 of AREERA, see below) competitive grants program, and the NRI competitive grants program.

Section 406 Legislation Authority

The 406 program is authorized in Section 406 of the Agricultural Research, Extension, and Education Reform Act of 1998, Public Law 105-185. Colleges and universities (as defined by section 1404 of the National Agricultural Research, Extension, and Teaching Policy Act of 1977) as well as 1994 land-grant universities (via Section 7206 of the Farm Security and Rural Investment Act of 2002) are eligible to apply for these funds. The following seven programs are currently funded under this authority. They are detailed beginning in Appendix A.

- *Water Quality*
- *Regional Pest Management Centers*
- *Crops at Risk from the Food Quality Protection Act Implementation*
- *Food Quality Protection Act Risk Mitigation Program for Major Food Crop Systems*
- *Methyl Bromide Transition Program*
- *Organic Transition Program*
- *Food Safety*

Other Legislative Authorities

The following two programs are authorized as Special Grants in Section 2(c), Act of August 4, 1965, 7 U.S.C. 450i (c), as amended, and Public Law 105-185. They are further detailed beginning in Appendix A.

- *Critical Issues*
- *Regional Rural Development Centers*

The National Agricultural Research, Extension, and Teaching Policy Act of 1977, as amended (7 U.S.C. 3101 et seq.), provides authority for the following two programs. They are detailed further beginning in Appendix A.

- *International Science and Education Grants Program*
- *Homeland Security Program*

Other Programs

Other programs include the following. They are detailed beginning in Appendix A.

- *Community Food Projects*
- *Organic Research and Extension Initiative*
- *Risk Management Education*

Extension Activities

All universities engage in research and teaching, but the nation's more than 100 land-grant colleges and universities, have a third critical mission—extension. “Extension” means “reaching out,” and, along with teaching and research, land-grant institutions “extend” their resources, solving public needs with college or university resources through non-formal, non-credit programs. These programs are largely administered through thousands of county and regional extension offices in nearly all of the Nation's 3,150 counties, which bring land-grant expertise to the most local of levels. And both the universities and their local offices are supported by CSREES, the federal partner in the Cooperative Extension System (CES). CSREES plays a key role in the land-grant extension mission by distributing annual Congressionally-appropriated formula funding to supplement state and county funds. CSREES affects how these formula funds are used through national program leadership to help identify timely national priorities and ways to address them. <https://nifa.usda.gov/program/agricultural-extension-programs-1890-institutions>

Formula Programs Include the following. They are detailed in Appendix A.

- *Smith-Lever Formula 3(b) and (c)*
- *1890 Institutions*

Smith-Lever 3(d) Programs

These targeted funds are allocated to the states to address special programs or concerns of regional and national importance and are primarily distributed according to the extent of the problem that requires attention in each state. The following extension programs are supported: (They are detailed in Appendix A.)

- *Expanded Food and Nutrition Program*
- *Pest Management*
- *Farm Safety*
- *Children, Youth, and Families at Risk*
- *Youth Farm Safety Education and Certification*
- *Sustainable Agriculture Research and Education (SARE)*
- *Extension Indian Reservation Program*

Other Extension Programs include the following. (They are detailed in Appendix A.)

- *Extension Services at the 1994 Institutions*
- *Renewable Resources Extension Act*
- *Rural Health and Safety*
- *1890 Facilities (Section 1447)*
- *(Payments to 1890 Colleges, Tuskegee University, and West Virginia State College)*
- *Federal Administration*
 - *Other*
 - *Ag in the Classroom*

Publicly-Funded Agricultural Research, Education, and Extension and Tracking Some of the Investment with CSREES Databases

The U.S. system of publicly-funded research, education, and extension in the areas of food, agriculture, and natural resources supports a diverse, complex knowledge base that is vital to food and fiber production, conservation of natural resources, and to the economic well being of the nation. The scientific expertise available through the federal and state research and education system constitutes a valuable national resource with the flexibility to respond quickly to changes in demand, threats to sustainability, and concerns about environmental quality. CSREES contributes a unique national perspective to the network of research, education, and extension partnerships maintained by the USDA and cooperating institutions. This vantage point is essential to the agency's regional and national coordination and tracking of public resources invested to address diverse research and outreach problems.

The Growing Need for Research, Education and Extension

In recent years, the need for problem-solving research and extension activities in food, agriculture, and natural resources has expanded. Changes in this agenda were given impetus by the U.S. Congress when it reauthorized USDA programs under the Food, Agriculture, Conservation, and Trade Act of 1990. This legislation emphasized food and fiber needs, long term viability and competitiveness, improvement of the quality of rural life, the assurance of supply of safe food, and enhancement of the environment and natural resource base. The growing consumer interest in environmental and social issues, as well as the increased complexity of contemporary research problems, has necessitated an increase in multi-disciplinary and interdisciplinary research, education, and extension work.

The evolving U. S. system of food, agricultural, and environmental research, education, and extension encompasses the programs of state agricultural experiment stations (SAES); colleges and departments of forestry, natural resources, family and consumer sciences, and veterinary medicine; 1890 and 1994 land-grant institutions and Tuskegee University; other cooperative institutions, including state and private colleges and universities; and USDA agencies (ARS, Economic Research Service (ERS), Forest Service, and Natural Resource Conservation Service(NRCS)) and federal departments. Research and extension programs are closely linked to and complement the teaching activities of the land-grant institutions. Additionally, research programs are integral to graduate education, through which scientists are prepared to confront future research challenges. For Science and Education Impacts see:

<https://nifa.usda.gov/impacts>

The teaching partnership is the most recent addition (1977) to the federal-state partnership comprising research, extension, and education. CSREES teaching initiatives support human capital development through programs that strengthen agricultural and natural resource sciences literacy in K-12 education, improve higher education curricula, modernize institutional academic capacity, and increase the diversity and quality of future graduates to enter the scientific and professional workforce. CSREES assists the nation's schools, colleges, and universities to develop essential strategies to meet future academic challenges. These include expanding student recruitment, preparing graduates in areas of national need, maintaining curricular relevance through innovative degree programs and technologies, developing academic infrastructure, and endowing graduates with problem-solving, communication, and hands-on collaborative learning skills and experiences they will need to lead scientific inquiry and meet the challenges of an ever-changing world.

Tracking CSREES and Land-Grant Activities

The research summaries utilized in this report are based on activities documented in the USDA's CRIS database and in part from annual reports of NRI and Cooperative Forestry Research projects, state annual

reports, impact statements, and information provided by the CSREES NPLs. CRIS information includes funded research that is either in progress or is recently completed, objectives and procedures of each project (AD-416), research KA and other classifications (AD-417), annual financial and management data (AD-419), and annual progress including accomplishments (AD-421). The scope of CRIS content includes essentially all projects supported or conducted by the USDA and under the aegis of the SAES. Some projects documented in CRIS are conducted by non-federal partner institutions without support from USDA funding. However, CRIS does not include all university-based research supported by sources other than the USDA. The focus of the portfolio analyses is on the projects supported or performed by CSREES. As the agricultural research base expands, including more institutions and scientists outside USDA and SAES in agricultural and related research, the management data in CRIS should be viewed as conservative estimates. This shortage of data may be most significant in the research areas at the boundaries of agricultural research.

The CSREES portfolio review, as stated throughout this document, includes research, education, and extension programs categorized by KA. Each CRIS project is categorized by Research Problem Areas (RPAs that equate directly to the KAs addressed in this report. The KAs provide a common basis for analyzing the targeted areas under review. CRIS has been an operational system since 1968 and provides a resource of fiscal data with a consistent basis since fiscal year 1970. CRIS data were designed to provide science content, but not financial accounting, which is conducted and controlled through processes administered by the Funds Management Branch under the Office of Extramural Programs in CSREES. CRIS information can be used in the broad sense for program accountability.

At present, the information collected by CRIS on activities relevant to program accountability is essentially limited to research, and, more recently, education. Efforts are underway to capture award and funding information for CSREES programs in education and extension. Development is underway on a new electronic web-based state POW reporting system to capture formula-funded outcomes, with the logic model as the fundamental element to structure data collection. These data will accommodate an integrated approach to CSREES portfolio analyses. Therefore, quantitative data are not yet consistently available for extension activities for this portfolio review.

More comprehensive CSREES accountability reporting is being pursued with maximum effort but will require several years to be completed. Implementation will most likely occur in phases drawing upon existing capabilities of CRIS, the Research, Education and Economics Information System (REEIS), Food and Agricultural Education Information System (FAEIS), and other established CSREES data and information systems. The integration of existing systems with expanded functionality and/or additional systems to address new segments of the process will provide more efficient collection and distribution of information. The integrated approach will reduce the effort and resource requirements for CSREES and all of the partnership while encompassing research, education and extension in a consistent approach allowing more effective program accountability.

Portfolio Self-Review Document Organization

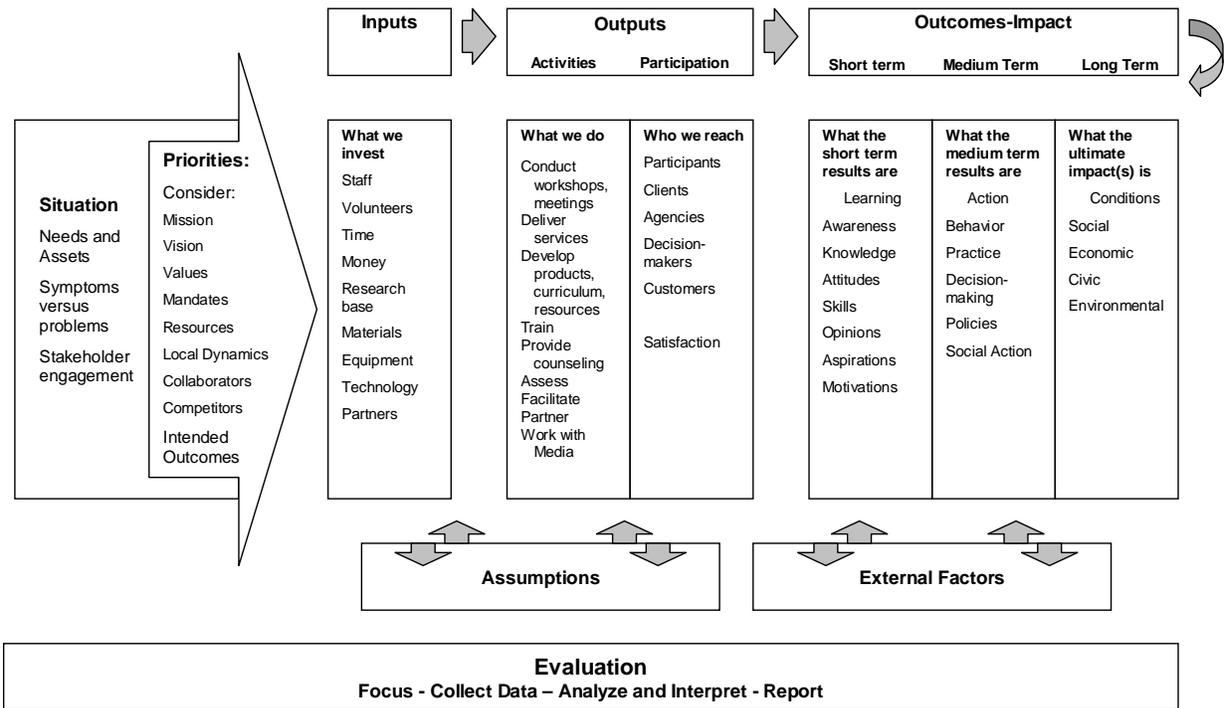
This first Section of the report contains a general description of the PREP and of CSREES, its vision, mission, functions, and funding authorities.

Section II contains a description of the overall portfolio and its component KAs. A conceptual “logic” model common to program evaluation is used to illustrate the main components of the Agency’s investments and work, the planned outcomes, and the logic of how the planned work is designed to effect

the desired results in solving national problems, meeting national needs and achieving the mission of the Agency (see Chart 3 which provides a generic logic model as an example of how a program is conceptualized). Section II also provides data on performance measures identified via the logic model, results of evaluation studies, success stories and planned new directions for Agency efforts. The substantive descriptions of the portfolio and its components were prepared by CSREES National Program Leaders – topic area experts who manage programs or topic-related KA activities.

Generic Logic Model

Figure 4 – Wisconsin Logic Model



Source: <http://www.uwex.edu/ces/pdande/evaluation/evallogicmodel.html>

The Government Accountability Office (GAO), the evaluation and oversight agency for Congress, promotes the use of logic models in good evaluation practice and has praised CSREES as a model in its use of logic models. The new POW/Annual Report guidelines for planning and accountability submissions for formula funds via the new web-based electronic reporting system under development require the use of the logic model and provide an explanation, contained in Table 1.

Table 1: Logic Model, Plan of Work/Annual Report Guidance

Program Logic Model: the conceptual tool for planning and evaluation which displays the sequence of actions that describe what the science-based program is and will do – how investments link to results. Included in this depiction of the program action are six core components:

1. **Identification of the national problem, need, or situation that needs to be addressed by the program.** The conceptual model will delineate the steps that are planned, based on past science and best theory, to achieve outcomes that will best solve the identified national problems and meet the identified needs. The medium term outcomes should reflect the actual program results, while the long term outcomes should reflect the larger societal influence.
2. **Assumptions:** the beliefs we have about the program, the people and processes involved, and the context and the way we think the program will work. These science-based assumptions are based on past evaluation science findings regarding the effects and functioning of the program or similar programs, program theory, stakeholder input, etc.
3. **External Factors:** the environment in which the program exists includes a variety of external factors that interact with and influence the program action. Evaluation plans for the program should account for these factors, which are alternative explanations for the outcomes of the program other than the program itself. Strong causal conclusions about the efficacy of the program must eliminate these environmental factors as viable explanations for the observed outcomes of the program. These identify the factors for which the scientific evaluation design must control in order to make causal conclusions.
4. **Inputs:** resources, contributions, and investments that are provided for the program. This includes federal, state, and local spending, private donations, volunteer time, etc.
5. **Outputs:** activities, services, events, and products that are intended to lead to the program’s outcomes in solving national problems by the causal chain of events depicted in the logic model. These activities and products are posited to reach the people who are targeted as participants or the audience or beneficiaries of the program. Output performance measures often include tallies, such as the number of persons targeted and reached (direct and indirect contacts), the number and type of grants awarded, etc.

An understanding of the actual inputs and outputs posited in the logic model comprises the process evaluation for the program. It is important to stop and consider these data, as they tell us what the REAL program is—that is, what has actually been implemented. Often times what federal managers plan and describe in the logic model is **not** what is eventually implemented in the field, and it is important to note what the true “program” really is. The effects of the planned program may actually be unknown, because the planned program NEVER ACTUALLY OCCURRED. It is important to understand and properly report all of this.

In addition, it is these PROCESS factors that managers actually control, and which they can manipulate to improve the program based on the evaluation feedback.

6. **Outcomes:** planned results or changes for individuals, groups, communities, organizations, or systems. These include short-, medium-, and long-term outcomes in the theorized chain of causal events that will lead to the planned solution of the identified national problems or meet national needs. These can be viewed as the public’s return on its investment, i.e., the value-added to society in the benefits it reaps from the program. Examples include research findings, changes in knowledge, skill development, and behavior (such as the number of people adopting a new technology or using a new product), capacities or decision-making, and policy development. Impact in this model refers to the ultimate consequence or effects of the program (e.g., increased economic security, improved air quality). Impact refers to the ultimate, longer-term changes in social, economic, civic, or environmental conditions.

This is also where the logic model loop is completed – the identified national problem should eventually be solved here. When we use the logic model, it should be clear to all involved in the program – what problems it intends to solve, how it is going to do it, how performance will be measured, and what ultimate outcomes and benefits we can expect. Evaluators can quickly assess what performance measures will be needed, and work with program managers to obtain the needed data.

While the logic model has been in use in evaluation for many decades, the agency has attempted to use it to highlight work accomplished in the evaluation period for this review. As such, the generic logic model has been customized to describe the work of the agency. The logic model and its various components are presented at length in Section II (p 40).

Other graphics are used to explain research investments – Logic Models and Honeycombs. For each portfolio, the charts show the relevant component KAs. For each KA, the Honeycombs depict the main areas of research identified by the scientific community that must be studied in order to address the identified KA (see Generic Honeycomb, p. 29). Honeycombs show CSREES accomplishments (shown by each area of investigation) and the identified needs (shown by each area of investigation) for the KA. The identified needs are usually translated into announcements of RFAs for grants. Such charts are also used to illustrate how CSREES teams with its federal agency partners in studying an area by adding in the names of other agencies targeted to specific parts of the honeycomb.

Not only can such charts be used for planning and accountability purposes, they can also be employed by NPLs to explain CSREES work and its needs for coverage of investigation in certain areas to meet national objectives.

Section III contains a description of each of the KAs mentioned in Section II and uses the same logic model format. The goal for each KA description is to provide concise, comprehensive insights into these activities and provide performance data to enable the Panel to assess CSREES outcomes.

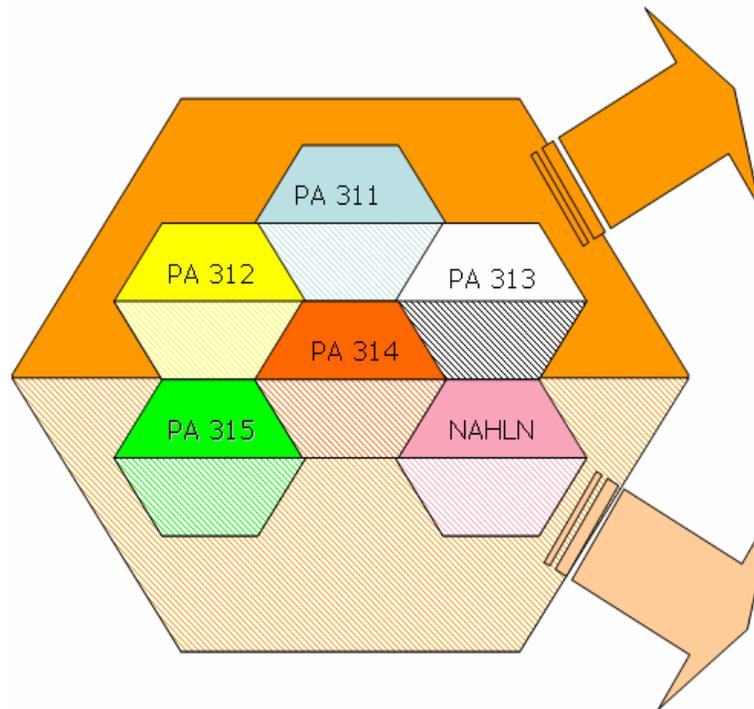
- Situation
- Assumptions
- External Factors
- Inputs
- Outputs
- Outcomes
- Success Stories
- New Directions

Section IV draws on the previous Sections and supplementary evidentiary materials to specifically address the various dimensions of OMB's Research and Development Criteria: relevance, quality, and performance. It is on these dimensions that the panel will be asked to rate the Agency's work for the portfolio and it is these portfolio review scores that will be used to inform the PART which will result in an overall PART score for the Agency's work on a related strategic goal. The portfolio score will also be used in BPI submissions. For each of the dimensions, descriptions and evidence are provided that best illustrate how the Portfolio met its strategic objective for the 2000-2004 timeframe. The PART, BPI, and this PREP are new evaluation efforts, so there might not be data available during the reporting timeframe for all the new performance measures now identified or required due to the portfolio process or new strategic goals.

While significant progress has been accomplished under this portfolio, the nation is facing new threats to its agricultural and natural resource-based industries. Experience from work accomplished thus far places the agency, in collaboration with its partners, to generate and use new knowledge to safeguard against these new threats.

Figure 5

Generic Honeycomb: ex. Portfolio 3.2B



This section lists Major Areas of Focus

Examples:

- Animal diseases
- Animal Well-being
- National Animal Health Laboratory Network (NAHLN)

Accomplishments This section lists selected examples of major accomplishments as reported by partners

- ex. Identified catfish gene mediated toxicity

Needs This section lists areas in need of continued or future research as indicated by executive branch, congress, stakeholders, department heads, National Program Leaders (NPLs), research trends, and emerging issues.

- ex. Equine laminitis

APPENDIX A:

Research and Education Activities

Formula Programs

Hatch Act

The foundation of the Federal-State partnership in agricultural research is financed through formula Hatch Act funding and matching State revenue. The Hatch Act was enacted in 1887 and has been amended numerous times since then. The Hatch Act allocates federal funds on a formula basis to the State Agricultural Experiment Stations of the 50 States, District of Columbia, Puerto Rico, Guam, Virgin Islands, Micronesia, American Samoa, and Northern Mariana Islands for research to promote a sound and prosperous agriculture and rural life. One hundred percent matching by state funds is required. Hatch funding supports sustained research activities in agricultural priority areas to address pre-commercial and/or non-funded technologies of public need. Hatch-funded research is complementary to ARS National Research Programs and State-based research, addressing technology gaps through coordinated programs. The States are required to use no less than 25 percent of Hatch funds for multi-state research projects. These projects are supported through regional committees which address critical and emerging issues in agricultural research.

McIntire-Stennis Cooperative Forestry

The Cooperative Forestry Research Act of October 10, 1962 established McIntire-Stennis funding. The Act authorizes funding of research in State institutions certified by a State representative designated by the governor of each State. The Act provides that appropriated funds be apportioned among States as determined by the Secretary after consultation with the legislatively mandated Forestry Research Advisory Council. The Council consists of 16-20 members representing Federal and State agencies concerned with developing and utilizing the Nation's forest resources, the forest industries, the forestry schools of the State-certified McIntire-Stennis eligible institutions, SAES, and volunteer public groups concerned with forests and related natural resources. Determination of apportionments follows consideration of pertinent factors including areas of non-federal commercial forest land, volume of timber cut from growing stock, and the non-Federal dollars expended on forestry research in the State. The Act also provides that payments must be matched by funds made available and budgeted from non-Federal sources by the certified institutions for expenditure on forestry research. Three percent of funds appropriated under this Act are set-aside for Federal administration.

Evans-Allen Program (1890 Colleges, Tuskegee University, and West Virginia State College)

The Evans-Allen program was established by the National Agricultural Research, Extension, and Teaching Policy Act of 1977, Section 1445. This program allocates funds on a formula basis for agricultural research at the 1890 Institutions, Tuskegee University and West Virginia State College. The agricultural research programs at the 1890 Land-Grant Colleges and Universities are designed to generate new knowledge which will assist rural underprivileged people and small farmers obtain a higher standard of living. Therefore, there is a high concentration of research effort in the areas of small farms, sustainable agriculture, rural economic development, human nutrition, rural health, and youth and elderly. The 2002 Farm Security and Rural Investment Act requires a 100% match of federal dollars. The Secretary may waive the match above 50% if an institution is incapable of meeting that requirement.

Animal Health and Disease Program

The National Agricultural Research, Extension, and Teaching Policy Act of 1977, Section 1433 provides for support of livestock and poultry disease research in accredited schools or colleges of veterinary medicine or SAES that conduct animal health and disease research. These funds provide support for new research initiatives and enhance research capacity leading to improved animal health, reduced use of antibacterial drugs and improved safety of foods of animal origin.

The funds are allocated on a formula basis in support of livestock and poultry disease research at accredited schools or colleges of veterinary medicine or State Agricultural Experiment Stations that conduct animal health disease research. Matching is required.

National Research Initiative (NRI) Competitive Grants

Section 2(b), Act of August 4, 1965, 7 U.S.C. 450i(b), as amended, authorizes Competitive Research Grants for periods not to exceed five years to SAES, all colleges and universities, other research institutions and organizations, Federal agencies, private organizations or corporations, and individuals to further the programs of the Department. The NRI supports research, education, and extension grants that address key problems of national, regional, and multi-state importance in sustaining all components of agriculture (farming, ranching, forestry including urban and agro-forestry, aquaculture, rural communities, human nutrition, processing and others). Such integrated projects hold the greatest potential to produce and transfer knowledge directly to end users.

Providing this support requires that NRI advance fundamental sciences in support of agriculture and coordinate opportunities to build on these discoveries through new efforts in education and extension that deliver science-based knowledge to people, allowing them to make informed, practical decisions. Accordingly, the NRI supports fundamental research, mission-linked research, and integrated research, education, and extension projects. These programs build on a foundation of ongoing research addressing key issues of national and regional importance to agriculture, forestry, human nutrition and related sciences.

The authority to support integrated projects is contained in Section 733 of the General Provisions of the Consolidated Appropriations Act, 2004 (Pub. L. 108-199), which provided CSREES with the authority to use up to twenty percent of the amount made available in the Act for the NRI, to carry out a competitive grants program under the same terms and conditions as those provided in Section 401 of the Agricultural Research, Extension, and Education Reform Act of 1998 (AREERA) (7 U.S.C. 7621).

It should be noted that within CSREES, integrated multi-functional projects are supported primarily through two competitive grants programs, the NRI competitive grants program described in this section and the Integrated Research, Education, and Extension (from Section 406 of AREERA, described below under Integrated Activities) competitive grants program.

Special Research Grants

Section 2(c), Act of August 4, 1965, 7 U.S.C. 450i (c), as amended, authorizes Special Research Grants for periods not to exceed three years to SAES, all colleges and universities, other research institutions and organizations, federal agencies, private organizations or corporations, and individuals. Previously, grants were made available for the purpose of conducting research to facilitate or expand promising breakthroughs in areas of the food and agricultural sciences. However, the Agricultural Research, Extension, and Education Reform Act of 1998 expanded the purposes under this authority to include extension or education activities. Grants funded in this account are only for research projects. Special Research Grants are awarded on a discretionary basis as well as through the use of competitive scientific

peer and merit review processes. These grants, numbering in the hundreds, will not be discussed further in this document.

Other Research

Critical Agricultural Materials

A program of research, technology development, and technology transfer was authorized for the development of critical agricultural materials from native agricultural crops having strategic and industrial importance.

Aquaculture Centers

Authorizes the establishment of aquacultural research, development and demonstration centers in the United States for the performance of aquaculture research and extension work and demonstration projects. Funding currently supports five regional aquaculture centers, as designated by Congress.

Sustainable Agriculture Research and Education Program (SARE)

Authorizes a program to facilitate and increase scientific investigation and education in order to develop agricultural practices which sustain resources for continued production, support development of new niche crops to improve agricultural diversity and heighten national security; reduce the use of chemical pesticides, fertilizers, and toxic natural materials in agricultural production; improve low-input farm management; take advantage of the experiences and expertise of farmers and ranchers through their direct participation and leadership in projects; and transfer reliable and timely information to farmers and ranchers. Grants are awarded on a regional basis by panels which include producers as well as scientific experts. (*see also SARE in Extension below*)

Supplemental and Alternative Crops

A research and pilot project program was authorized for the development of supplemental and alternative crops. The program has been directed to support the development of canola, hesperole and other natural products from desert plants.

1994 Institution Research Grants

The Equity in Educational Land-Grant Status Act of 1994, Public Law 103-382, as amended, authorizes a competitive grants program for the 30 institutions designated as 1994 institutions. Section 7201 of the Farm Security and Rural Investment Act of 2002 adds a new institution, increasing the number of recipients eligible to receive funding under this program to 31. The program allows scientists at the 1994 institutions to participate in agricultural research activities that address tribal, National, and multi-state priorities.

Federal Administration (direct appropriation)

Authority for direct appropriations is provided in the annual Agriculture, Rural Development, Food and Drug Administration and Related Agencies Appropriation Act. These funds are used to provide support services in connection with planning and coordination of all research and education programs administered by CSREES, including the Research, Education, and Economics Data Information System (REEIS).

Small Business Innovation Research (SBIR) Program

Authorizes the award of competitive grants to science-based small business firms for the support of research dealing with Forests and Related Resources; Plant Production and Protection; Animal and Wildlife Production and Protection; Air, Water and Soils; Food Science and Nutrition; Rural

and Community Development; Aquaculture; Industrial Applications; and Marketing and Trade. The program is funded through a statutory mandatory assessment of 2.5 percent on all USDA externally supported research and is managed by CSREES.

Biotechnology Risk Assessment Research Competitive Grant Program

This program was authorized by the 1990 Farm Bill and funds research in support of biotechnology research and regulation related to environmental risk assessment. The program is funded through a 2 percent assessment on USDA-supported biotechnology research.

Higher Education

Graduate Fellowship Grants

The National Agricultural Research, Extension, and Teaching Policy Act of 1977, Section 1417(b)(6), Higher Education-Graduate Fellowship Grants are awarded on a competitive basis to colleges and universities to conduct graduate training programs to stimulate the development of food and agricultural scientific expertise in targeted national need areas. This program strengthens higher education in the food and agricultural sciences by producing graduates capable of fulfilling the Nation's requirements for professional and scientific expertise. Doctoral students are recruited and supported for three years of training in targeted specializations characterized by shortages of expertise.

Institution Challenge Grants

Pursuant to Section 1417(b)(1), initiated in FY 1990, stimulates and enables colleges and universities to provide the quality of education necessary to produce baccalaureate or doctor of veterinary medicine graduates capable of strengthening the nation's food and agricultural professional work force. It is intended that projects supported under this program will 1) address a State, regional, national, or international educational need, 2) involve a creative or nontraditional approach toward addressing that need which can serve as a model to others, 3) encourage and facilitate better working relationships in the university science and education community, as well as between universities and the private sector, to enhance program quality and supplement available resources, and 4) result in benefits which will likely transcend the project duration and USDA support. U.S. colleges and universities that offer a baccalaureate or first professional degree in at least one discipline or area of the food and agricultural sciences may submit proposals. All Federal funds competitively awarded under this program must be matched by the universities on a dollar-for-dollar basis from non-federal sources.

1890 Institution Capacity Building Grants

Initiated in 1990, under 1417(b)(4), this program was established to build the institutional capacities of the 1890 historically black land grant colleges and Tuskegee University through cooperative linkages with Federal and non-Federal entities. This program is designed to strengthen institutional teaching and research capacities, through cooperative programs with Federal and non-Federal entities, including curriculum, faculty, scientific instrumentation, instruction delivery systems, student experimental learning, student recruitment and retention, studies and experimentation, centralized research support systems, and technology delivery systems, to respond to identified State, regional, national, or international educational needs in the food and agricultural sciences, or rural economic, community, and business development. Matching is encouraged.

Multicultural Scholars

Competitively awarded grants program open to colleges and universities for undergraduate multicultural four-year scholarships to meet national needs for training food and agricultural scientists and professionals. Multicultural eligibility is specifically defined as African-Americans, Hispanics, Asians or Pacific Islanders, and Native Americans or Alaskan Natives. Matching funds are required.

Hispanic-Serving Institutions Education Grants Program

The competitive Hispanic Education Partnership Grants Program, established under Section 1455(a), is intended to promote and strengthen the ability of Hispanic-Serving Institutions (HSI) to carry out higher education teaching programs in the food and agricultural sciences. (HSI designation requires an undergraduate Hispanic enrollment of at least 25 percent.) About 240 such institutions are eligible to compete. Funded projects address one or more targeted need areas: curricula design and materials development; faculty preparation and enhancement for teaching; instruction delivery systems; scientific instrumentation for teaching; student experiential learning; and student recruitment and retention.

Tribal Colleges Education Equity Grants Program

The Equity in Educational Land-Grant Status Act of 1994, Public Law 103-382, as amended, launched in 1996 a formula-based effort to enhance educational opportunities for Native Americans by strengthening instructional programs in the food and agricultural sciences at the 31 tribally controlled colleges designated as the 1994 Land-Grant Institutions. Section 7202 of the Farm Security and Rural Investment Act of 2002 increases the authorized amount from \$50,000 to \$100,000 per institution. Funds may be used to support teaching programs in the food and agricultural sciences in the targeted need areas of curricula design and instructional materials development; faculty development and preparation for teaching; instruction delivery systems; student experiential learning; equipment and instrumentation for teaching; and student recruitment and retention. These institutions serve approximately 14,000 Native American students. Projects focus on undergraduate and graduate studies in the food and agricultural sciences.

Tribal Colleges Endowment Fund

This program, authorized by Public Law 103-382 and launched in 1996, distributes interest earned by an endowment established for the 1994 Land-Grant Institutions (31 Tribally-controlled colleges) as authorized in the Equity in Education Land-Grant Status Act of 1994. The Endowment Fund enhances education in agricultural sciences and related areas for Native Americans by building educational capacity at these institutions in the areas of curricula design and materials development, faculty development and preparation for teaching, instruction delivery systems, experiential learning, equipment and instrumentation for teaching, and student recruitment and retention. At the end of each fiscal year, the Secretary withdraws the earned interest income from the endowment fund for the fiscal year, and after subtracting administrative costs, CSREES distributes the adjusted income as follows: 60 percent of the adjusted income from these funds is distributed among the 1994 Land-Grant Institutions on a pro rata basis, the proportionate share being based on the Indian Student Count, and 40 percent of the adjusted income is distributed in equal shares to the 1994 Land-Grant Institutions.

Secondary/2-Year Post Secondary

The National Agricultural Research, Extension, and Teaching Policy Act of 1977, Section 1417(j), as amended, established the Secondary and Two-year Postsecondary Agriculture Education Challenge Grants program. It is designed to promote and strengthen secondary education in agribusiness and agri-science and to increase the number and/or diversity of young

Americans pursuing college degrees in the food and agricultural sciences. The intent of the program is to encourage teachers to creatively incorporate elements of agri-science and agribusiness into secondary education programs. Matching required.

Alaska Native-Serving and Native Hawaiian-Serving Institutions

Authorized by Section 759 of Public Law 106-78, this program was authorized to build educational capacity within the Native Alaskan and Native Hawaiian serving institutions. The intent of the legislation is to assist these institutions to carry out higher education teaching programs in the food and agricultural sciences.

Integrated Activities

Section 406 Legislation Authority

The following seven programs are currently funded under this authority:

Water Quality

The purpose of this program is to improve the quality of our Nation's surface water and groundwater resources through integrated research, education and extension activities.

Regional Pest Management Centers

These centers are the focal point for team building efforts, communication networks, and stakeholder participation within a given region to address a range of pest management issues confronting farmers and other pest managers.

Crops at Risk from the Food Quality Protection Act Implementation

The goal of the program is to develop new multiple-tactic IPM strategies to assist in the transition period for cropping systems affected by the implementation of the Food Quality Protection Act of 1996 - Food Quality Protection Act Risk Management Program for Major Food Crop Systems.

Food Quality Protection Act Risk Mitigation Program for Major Food Crop Systems

This program emphasizes development and implementation of new and innovative pest management systems designed to maintain the productivity and profitability of major acreage crops while meeting or exceeding environmental quality and human health standards of the Food Quality Protection Act of 1996.

Methyl Bromide Transition Program

This program is designed to support the discovery and implementation of practical pest management alternatives for commodities affected by the methyl bromide phase-out.

Organic Transition Program

This program supports the development and implementation of biologically based pest management practices that mitigate the ecological, agronomic and economic risks associated with a transition from conventional to organic agricultural production systems.

Food Safety

The National Integrated Food Safety Initiative (NIFSI) is primarily a food safety program, but a portion of this program addresses processing technologies for reduction and elimination of food-borne pathogens and allergens. Under Integrated Authority (Section 406), CSREES administers competitive grants in food safety activities that integrate research, education, and extension in

priority areas that are based on stakeholder input. The food science and technology component addresses the impact of alternative technologies on food safety.

Other Legislative Authorities

The following two programs are authorized as Special Grants in Section 2(c), Act of August 4, 1965, 7 U.S.C. 450i (c), as amended, and Public Law 105-185.

Critical Issues

This program supports the development of early prevention strategies to prevent, manage or eradicate new and emerging diseases, both plant and animal, which would prevent loss of revenue to growers and producers. These funds are provided under competitive awards.

Regional Rural Development Centers

This program provides funds at four regional centers in Pennsylvania, Mississippi, Utah, and Iowa. Programs are designed to improve the social and economic well-being of rural communities in their respective regions. These funds are distributed according to the extent of the problem that requires attention in each region.

The National Agricultural Research, Extension, and Teaching Policy Act of 1977, as amended (7 U.S.C. 3101 et seq.), provides authority for the following two programs:

International Science and Education Grants Program

The International Science and Education Grants Program supports research, extension, and teaching activities that will enhance the capabilities of American colleges and universities to conduct international collaborative research, extension and teaching. ISE projects are expected to enhance the international content of curricula; ensure that faculty work beyond the U.S. and bring lessons learned back home; promote international research partnerships; enhance the use and application of foreign technologies in the U.S.; and strengthen the role that colleges and universities play in maintaining U.S. competitiveness. This is a competitive program.

Homeland Security Program

This program provides support for a unified network of public agricultural institutions to identify and respond to high risk biological pathogens in the food and agricultural system. The network will be used to increase the ability to protect the nation by identifying, containing, and minimizing disease threats.

Other Programs

Community Food Projects

This program is funded through the Food Stamp Act and competitively awards grants to support the development of Community Food Projects with a one-time infusion of Federal dollars to make such projects self-sustaining or to support stand-alone technical and technical assistance activities. Community Food Projects are designed to meet the food needs of low-income people, increase the self-reliance of communities in providing for their own food need; and promote comprehensive responses to local food, farm and nutrition issues.

Organic Research and Extension Initiative

The Farm Security and Rural Investment Act of 2002 established this program with \$3 million per year for Fiscal Years 2004-2008 to fund organic farming and marketing research. These funds are disbursed through a competitive grants program. The purpose of the program is to fund research that will enhance organic producers' and processors' abilities to grow and market high-quality organic food, feed, and fiber. These funds are allocated for high-priority aspects of organic agricultural systems research, education, and extension. Priority concerns encompass biological, physical, and social sciences (including economics).

Risk Management Education

The Risk Management Education Competitive Grants program was authorized in the Agricultural Risk Protection Act, signed into law in August 2000. The legislation provides \$5 million to CSREES which, in turn, competitively awards four regional RME centers located as follows: Northeast Region at the University of Delaware; North Central Region at the University of Nebraska-Lincoln; Southern Region at the Texas A&M University, Stephenville, TX; and Western Region at the Washington State University. The Digital Center for Risk Management Education at the University of Minnesota, also awarded a grant, provides electronic and other support to the four regional RME centers and maintains a library of accomplishments and other risk management-related materials. The program competitively awards grants to address national, regional and local risk management issues to allow U.S. producers to have the knowledge, skills and tools needed to make informed risk management decisions for their operations.

Extension Activities

Formula Programs

Smith-Lever Formula 3(b) and (c)

Federal base program funds authorized under Smith-Lever Act 3(b) and (c) and allocated on a formula basis support Cooperative Extension programs at the 1862 land-grant universities. Funds are allocated on a formula basis to support cooperative extension work in 50 States, Puerto Rico, Guam, Virgin Islands, Micronesia, American Samoa, and Northern Mariana Islands. The States are required to spend no less than 25 percent of Smith-Lever funds on multi-state or regional extension activities. One hundred percent non-federal match is required for 1862 institutions, and 50 percent match with potential waiver applies to territories. The District of Columbia receives extension funds through separate legislative authority.

1890 Institutions

The 1890 Extension program supports the educational base program as well as specific national initiatives at the 1890 Land-Grant Institutions and Tuskegee University. Funding for the Extension programs at these institutions primarily addresses the needs of small-scale and minority agricultural producers and other limited-resources audiences. The 2002 Farm Security and Rural Investment Act requires a 100 percent match of federal dollars. The Secretary may waive the match above 50 percent if an institution is incapable of meeting that requirement.

Smith-Lever 3(d) Programs

These targeted funds are allocated to the states to address special programs or concerns of regional and national importance and are primarily distributed according to the extent of the problem that requires attention in each state. The following extension programs are supported:

Expanded Food and Nutrition Program

EFNEP is designed to assist limited resource audiences in acquiring the knowledge, skills, attitudes, and changed-behavior necessary for nutritionally sound diets, and to contribute to their personal development and the improvement of the total family diet and nutritional well-being.

Pest Management

Integrated Pest Management (IPM) promotes minimized pesticide use, enhanced environmental stewardship, and sustainable systems. This program targets three areas: commercial agricultural producers, urban audiences (including parks and schools), and natural resources. The goals for the National IPM program (June 2, 2003) are to: 1) improve economic benefits related to the adoption of IPM practices; 2) reduce potential human health risks from pests and the use of IPM practices; and 3) minimize adverse environmental effects from pests and the use of IPM practices.

Farm Safety

The primary purpose of this funding is to provide seed money to develop farm safety programs that meet the states' most critical needs. CSREES participates in regional partnership development meetings and funds farm safety initiatives in U.S. states and territories.

Children, Youth, and Families at Risk

Through an annual Congressional appropriation for the National Children, Youth, and Families at Risk (CYFAR) Program, CSREES allocates funding to land-grant university extension services for community-based programs for at-risk children and their families. Since 1991, CYFAR has supported programs in more than 600 communities in all U.S. states and territories. State and local public and private organizations have contributed cash and in-kind resources that match or exceed the federal appropriation.

Youth Farm Safety Education and Certification

The scope of this project is to develop and assess the effectiveness of a hazardous occupation certification program for youth employed in agriculture and determine the resources required for implementation of a national certification program.

Sustainable Agriculture Research and Education (SARE)

The Smith-Lever 3(d) funds in SARE are used for its Professional Development Program which funds educational programs for extension, NRCS, and other ag. professionals through competitive grants and state and regional activities. Grants are awarded on a regional basis by panels which include producers as well as scientific experts (See also SARE in Research and Education above).

Extension Indian Reservation Program

The Extension Indian Reservation Program (EIRP) was authorized by the 1990 Farm Bill (P.L. 101-624). This measure directs that the "Secretary of Agriculture, acting through the Extension Service, shall establish appropriate extension education programs on Indian Reservations and tribal jurisdictions." The legislation specified consultation with the Bureau of Indian Affairs, the Intertribal Agriculture Council, and the Southwest Indian Agriculture Association in establishing these extension programs.

Other Extension Programs

Extension Services at the 1994 Institutions

The purpose of the Tribal Colleges Extension Program is to provide funding for the 1994 Land-Grant Institutions to conduct non-formal education and outreach activities that will improve conditions in Native American communities. Through a competitive application process, awards

are made in one or more of the following extension base program areas: Agriculture; Community Resources and Economic Development; Family Development and Resource Management; 4-H and Youth Development; Leadership and Volunteer Development; Natural Resources and Environmental Management; and Nutrition, Diet and Health.

Renewable Resources Extension Act

The Renewable Resources Extension Act (RREA) provides funding for expanded extension programs in forest and range resources. Funds are distributed to all 1862 and 1890 land grant universities and Puerto Rico, Virgin Islands and Guam.

Rural Health and Safety

The Rural Health and Safety Education Act of 1990 helps rural residents avoid the numerous obstacles to maintaining their health status. This program maintains the ongoing rural health projects in Mississippi and Louisiana that focus on training health care professionals in rural areas.

1890 Facilities (Section 1447) (Payments to 1890 Colleges, Tuskegee University, and West Virginia State College)

Public Law 95-113, as amended, provides support to the 1890 Land-Grant Colleges and Universities for fostering, developing, implementing and improving extension educational programs to benefit their clientele. In accordance with the Agricultural Research, Extension, and Education Reform Act of 1998, Public Law 105-185, eligible State institutions are required to submit a five-year Plan of Work to CSREES for approval before these formula funds are distributed.

Federal Administration

Other

Provides a portion of the general operating funds from the federal staff, and national program planning, coordination, and program leadership for the extension work in partnership with the states and territories.

Ag in the Classroom

Agriculture in the Classroom is a grassroots program coordinated by the United States Department of Agriculture. Its goal is to help students gain a greater awareness of the role of agriculture in the economy and society, so that they may become citizens who support wise agricultural policies. The program is carried out in each state, according to state needs and interests, by individuals representing farm organizations, agribusiness, education and government.

Section II – Nutrition Portfolio

INTRODUCTION

This self review reports the work being conducted by CSREES to improve the nation's nutrition and health. Evidence of CSREES programs' relevance, quality and performance is presented and organized in a context based on logic models.

The Nutrition Portfolio aligns with USDA's and CSREES's Strategic Goal 4: Improve the Nation's Nutrition and Health. It is defined by two closely allied Strategic Objectives:

- Objective 4.1. Improve Human Health by Better Understanding the Nutrient Requirements of Individuals and the Nutritional Value of Foods
- Objective 4.2. Promote Healthier Food Choices and Lifestyles

For the purpose of this review these objectives are discussed in detail in Section III, under Portfolios 4.1 and 4.2. However, because these objectives are so closely integrated, and it is very important that they be integrated, they are discussed together in this section of the report. What is promoted as healthier food choices and lifestyles is based on what is known about nutrient requirements and food composition. How messages are communicated is based on what is known from nutrition education research and practice. On the other hand, the difficulties that people have in achieving and maintaining good nutritional health help set the agenda for basic and applied nutrition research and practice.

Portfolio 4.1, Improve Human Health by Better Understanding the Nutrient Requirements of Individuals and Nutritional Value of Foods includes Knowledge Areas (KAs) 701 and 702:

- KA 701 – Nutrient Composition of Food
- KA 702 – Requirements and Function of Nutrients and Other Food Components

Portfolio 4.2, Promote Healthier Food Choices and Lifestyles includes KAs 703 and 704:

- KA 703 - Nutrition Education and Behavior
- KA 704 – Nutrition and Hunger in the Population

The vision of the CSREES Nutrition Program is active, healthy Americans in healthy communities.

The mission of the Nutrition Program is to support CSREES's strategic goal to "Improve the Nation's Nutrition and Health" by providing leadership for strong research, education and extension programs in partnership with the university system and communities to develop the research base for guidance on diet and physical activity and to develop and carry out effective educational and environmental strategies to improve the Nation's health.

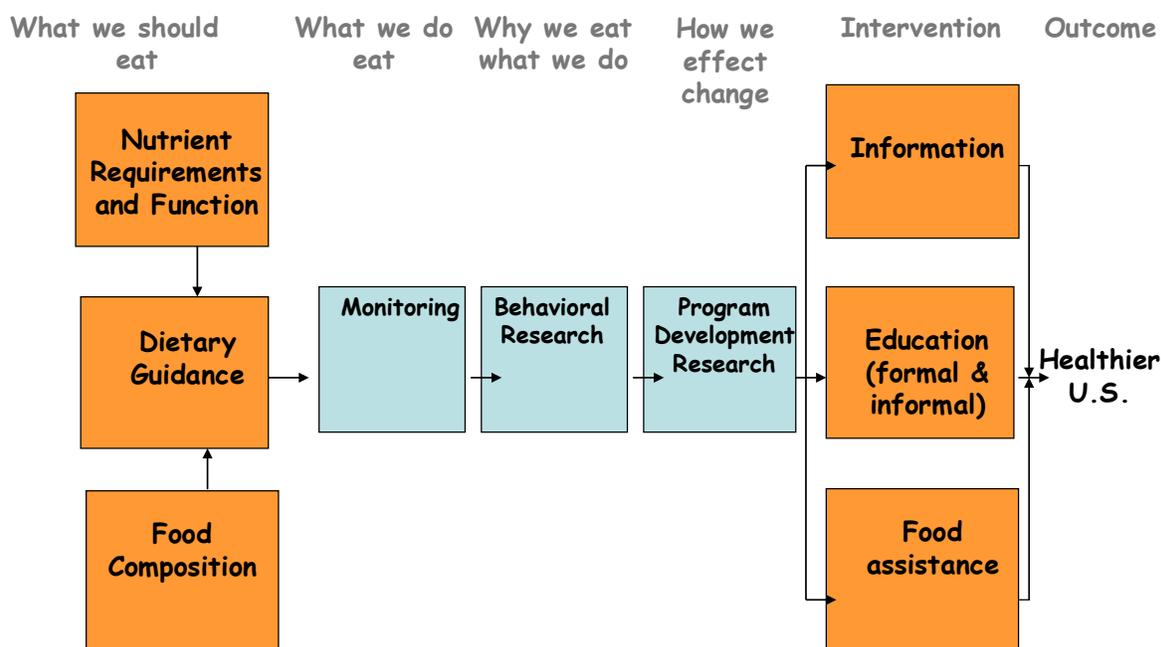
This self-study document was developed by the CSREES Nutrition Team consisting of National Program Leaders in the Family, 4-H, and Nutrition Unit and the Competitive Programs Unit: Helen Chipman, Shirley Gerrior, Etta Saltos, Marilyn Swanson, Edith Thomas, Dionne Toombs, Elizabeth Tuckermanty, Susan Welsh and Wells Willis in collaboration with staff from the Planning and Accountability Office.

OVERVIEW

Portfolios 4.1 and 4.2 support CSREES’s Strategic Goal “Improve the Nation’s Nutrition and Health.” They also support President Bush’s initiative for a HealthierUS (<http://www.healthierus.gov/>). The two most important objectives of the President’s initiative are to improve the nutrition and physical activity of Americans. Food and physical activity choices made by individuals today have long-ranging health implications. Major causes of morbidity and mortality, including heart disease, type 2 diabetes, hypertension, osteoporosis, and certain cancers are related to poor dietary choices and sedentary lifestyles. Furthermore, poor diet and physical inactivity resulting in energy imbalances are the most important factors contributing to the increase in obesity which has reached epidemic proportions in the United States. USDA has a mandated, unique responsibility for the American food system – an essential component of health maintenance and chronic disease prevention. In the past, when food was more scarce, consumer demand was overshadowed by the limits of the food supply. Today, with a more abundant food supply and a clearer understanding of the relationship between food and health, consumer demand is the driving force of the American food system. However, the population is also struggling with increasing time pressure, new cultural influences, a changing food supply, and declining food related skills, making the need for science-based guidance on diet and physical activity ever more important.

Portfolios 4.1 and 4.2 are highly integrated within CSREES and coordinated with the nutrition related work of other USDA and Federal agencies. Figure 6 shows how the components of Portfolios 4.1 and 4.2 and the work of other agencies complement each other in progressing toward the achievement of a HealthierUS.

Figure 6 - CSREES: Research, Education and Extension for a HealthierUS



The first column of Figure 6 shows that research is supported by CSREES to address the question “What we should eat?” It includes work represented by the KAs in Portfolio 4.1 – 701: Nutrient composition of food, and 702: Requirements and Function of Nutrients and Other Food Components. CSREES supports

extramural research on nutrients and bioactive food components. CSREES's sister agency, the Agricultural Research Service (ARS), conducts similar work on an intramural basis. CSREES's work classified under KA 701 focuses primarily on nutrient bioavailability and interrelationships among nutrients. ARS conducts research on the quantities of nutrients in food to maintain their National Nutrient Data Bank. The continually evolving body of research knowledge on nutrient requirements and food composition forms the basis of Dietary Reference Intakes and the "Dietary Guidelines for Americans." The Dietary Guidelines, based on recommendations of an expert advisory committee, have been released every five years since 1980 by USDA and the US Department of Health and Human Services (HHS). They are a statement of Federal nutrition policy and as such form the basis of all Federal nutrition education and extension/outreach programs for the general public.

Monitoring of the population to learn about food and nutrient intakes and health-related behaviors is depicted in the first horizontal blue box. Large scale national nutrition monitoring studies are carried out by ARS and HHS. Smaller scale studies of food choices by specific population groups are conducted by CSREES. Identifying the gaps between what research indicates Americans should be eating and what research indicates they are eating is necessary to establish goals for nutrition education research and nutrition intervention programs.

Information on nutrient needs and intakes is necessary but not sufficient to improve the American diet. Therefore, the next two blocks in Figure 6 address "Why we eat what we do?" and "How we effect change." These are the themes of the nutrition education research component of Portfolio 4.2, "Promote healthier food choices and lifestyles." The first theme involves understanding what behavioral factors influence choices of food and physical activity. The second theme involves developing, testing and evaluating intervention programs that help people move from where they are to a pattern close to the Dietary Guidelines. These nutrition education research areas are represented by KA 703, "Nutrition education and behavior." KA 704, "Nutrition and hunger in the population," has just been added to the CRIS tracking system. Research projects that in the future might be coded as KA 704 are likely to have been coded as KA 703 in the past. USDA's Economic Research Service (ERS) and the Food and Nutrition Service (FNS) also support nutrition education research, but their projects are usually targeted towards food assistance programs, while CSREES generally supports nutrition education studies with broader applicability.

The research described above is the basis for the intervention programs shown in the last column of Figure 6. Guidance on food safety and food resource management is also included in nutrition education programs, but CSREES supported research in these areas has been included in other Portfolios. The top block in the last column refers to the dissemination of nutrition information which is a should function of all agencies involved in nutrition. Programs depicted in the second block include formal nutrition education supported by CSREES's Higher Education programs as well as informal education programs carried out by CSREES's Cooperative Extension System (CES) program in Food, Nutrition and Health; CSREES's Expanded Food and Nutrition Education Program (EFNEP); CSREES's 4-H and youth development programs; the Maternal and Child Health program which is coordinated between CSREES and ARS; and the Food Stamp Nutrition Education (FSNE) program which is funded by USDA's Food and Nutrition Service (FNS) and state governments and largely carried out by CES. Barriers, implementation gaps, and resource shortages encountered by nutrition education intervention programs inform the agenda for research on nutrient requirements, food composition and nutrition education.

The last block in Figure 6 represents the direct intervention provided by food assistance programs. Most of these are administered by FNS with their Food Stamp Program, WIC and Child and Adult Care Feeding Programs. Also included in this block is CSREES's Community Foods Competitive Grants Program which takes an ecological approach to meeting the food needs of high risk communities.

Figure 6 illustrates the integration between CSREES's two nutrition Portfolios. There is also extensive coordination with the work of other USDA agencies and other Federal agencies that make important contributions to the President's goal for a HealthierUS. Coordination is ensured by active participation in intra- and inter- departmental nutrition coordinating committees. In addition, CSREES works to integrate its research, education and extension activities within each portfolio. This will be shown in Section III. The following four paragraphs explain the four KAs and their interrelationships.

Nutrient Composition of Food (KA 701) Work on food composition is concerned with the determination of the quantities of nutrients and other food components in food; development of analytical methods; development and maintenance of specialized food composition data bases; development of software and other systems to facilitate use of data on food composition, including recipe calculations; development and evaluation of educational materials on food composition; and dissemination of information on food composition for professionals, students and the public.

Requirements and Function of Nutrients and Other Food Components (KA 702) This area is concerned with defining nutrient requirements and functions throughout the human life span and in response to the environment. Functions include cellular and molecular regulation of gene expression by specific nutrients. This area is also concerned with the development of methods that quantify relationships of nutritional status to well-being in order to provide a scientific basis for establishing Dietary Reference Intakes and Dietary Guidelines. Programs on nutrient requirements and function also focus on the development and evaluation of education activities, strategies and materials; and with the dissemination of related information for professionals, students and the public.

Nutrition Education and Behavior (KA 703) Work in nutrition education and behavior is concerned with assessment of food intake and dietary patterns, factors that influence food intake and dietary patterns, interrelationships among these factors, and assessment of food and nutrient intake in relation to dietary reference intakes, dietary guidance and food plans. The focus is frequently on population groups at nutritional risk, such as low income and minority groups, and on the factors that promote or hinder healthful food choices in these groups. Work in nutrition education and behavior is also concerned with the development, implementation, and evaluation of educational activities and strategies leading to improved attitudes, skills, and behaviors of professionals, students, and the public. Areas of work include but are not limited to: food consumption, use, and dietary patterns; nutrition monitoring and surveillance; development of dietary standards, dietary guidance, and food guides to meet nutritional needs of the general population and population subgroups with special needs; dietary assessment methods; factors that influence dietary status and behavior change including food accessibility and affordability; development and evaluation of education, communication, and food assistance strategies, programs, and policies.

Nutrition and Hunger in the Population (KA 704) This new knowledge area code has not yet been used in the CRIS tracking system. Although no research projects have been coded into CRIS using the 704 code, text searches of the CRIS data base show projects are increasingly being carried out that address hunger and food security in the population. Currently these projects are most often coded in KA 703. In addition, some important extension/outreach work addresses hunger and food security. These extension/outreach projects and funding for them will be discussed in Section III. The scope of work in KA 704 will address food insecurity, insufficiency, and hunger in the population. This includes the development of assessment methods and pro-active attempts at hunger reduction through food banks, communities organizing to gain farmers markets, community gardens, gardening, food buying clubs, food recovery, and gleaning. Areas or work include but are not limited to: Assessments of food sufficiency in the population, and development and evaluation of strategies for addressing food insufficiency.

Note: Research and Extension/outreach activities carried out on food safety and the non-nutrition aspects of healthy lifestyles are addressed in other Portfolios.

The next two figures further illustrate the integration described above. The first figure shows the components of Portfolio 4.1 and 4.2. The second figure shows CSREES in relation to the other agencies and groups who work toward improving the nation's nutrition and health.

The honeycomb graphic is an attempt to summarize and simplify the complexity of the portfolio. The honeycomb figure is intended to represent a whole that can be subdivided into interrelated parts. The split in color represents that, within each whole, there are both accomplishments (solid colors) & areas in need (shaded colors).

Figure 7

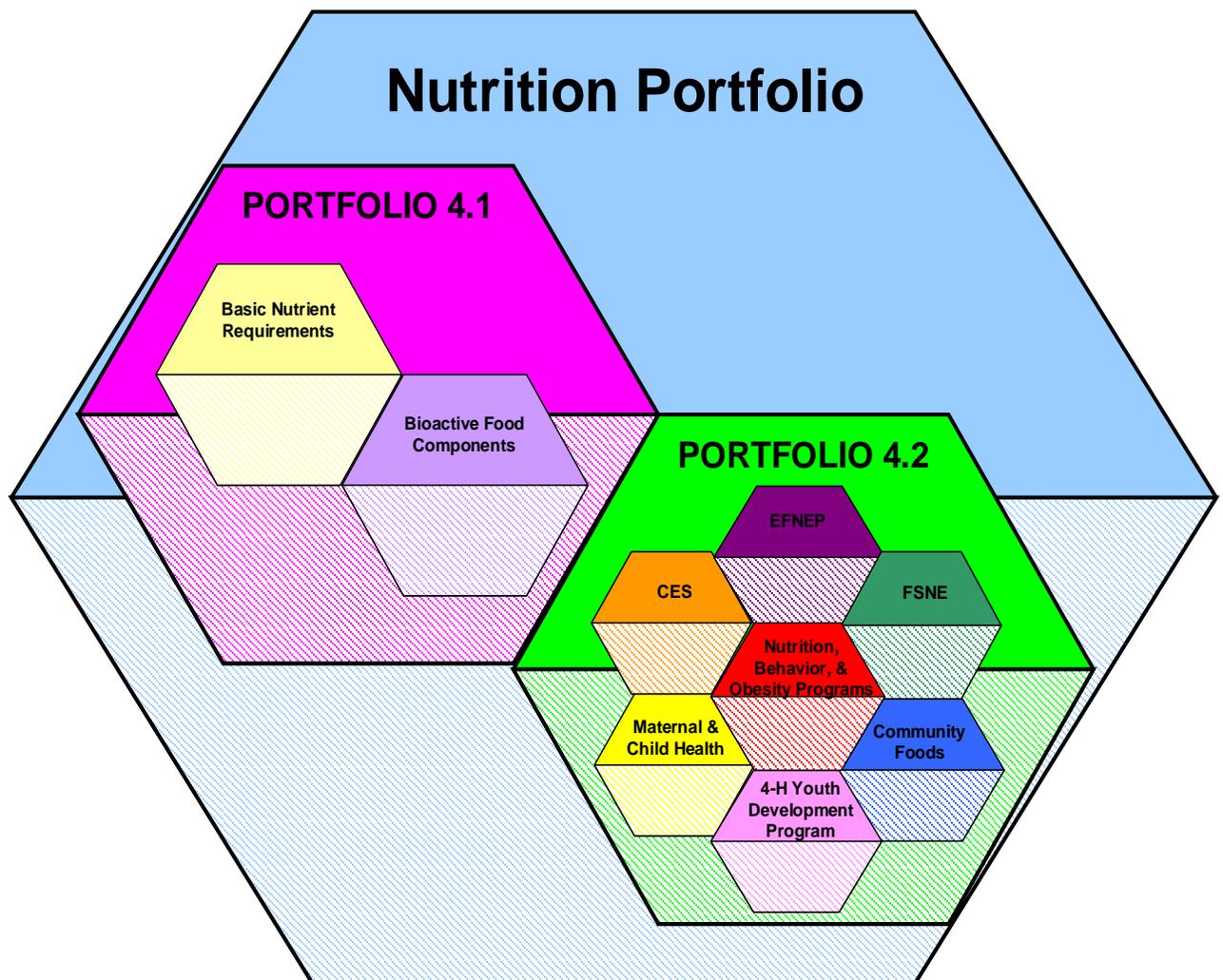
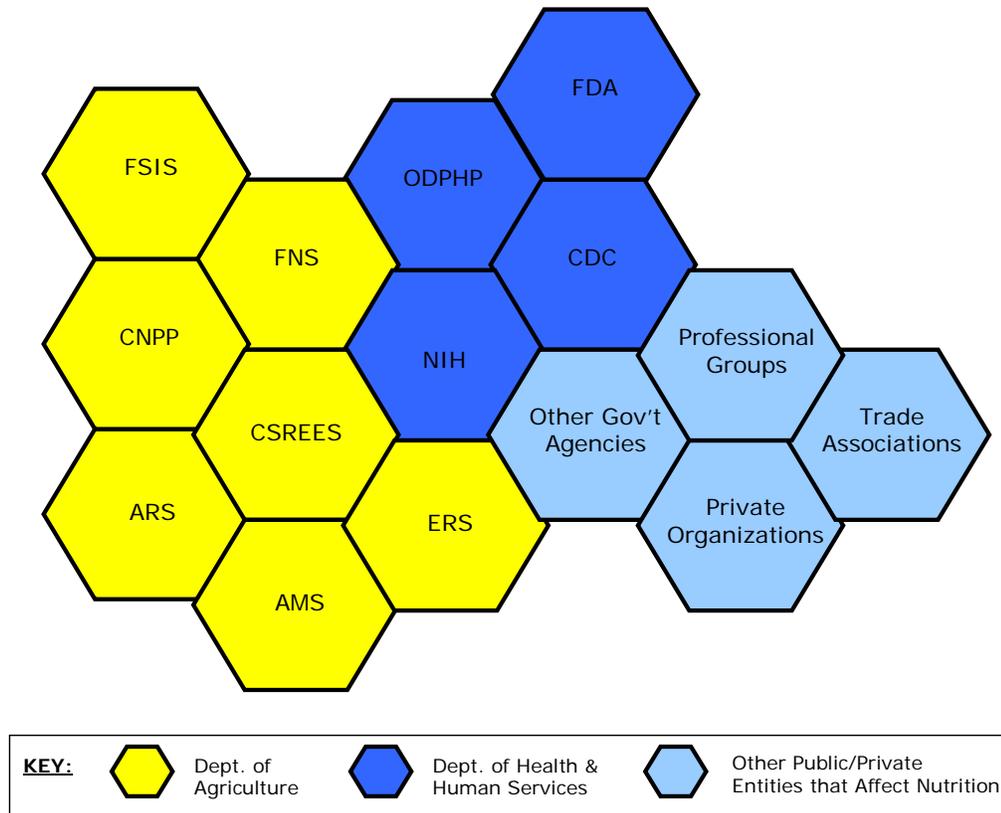


Figure 8

Agencies and Other Groups with Major Programs Addressing HealthierUS Nutrition Goals



INTRODUCTION TO THE LOGIC MODEL

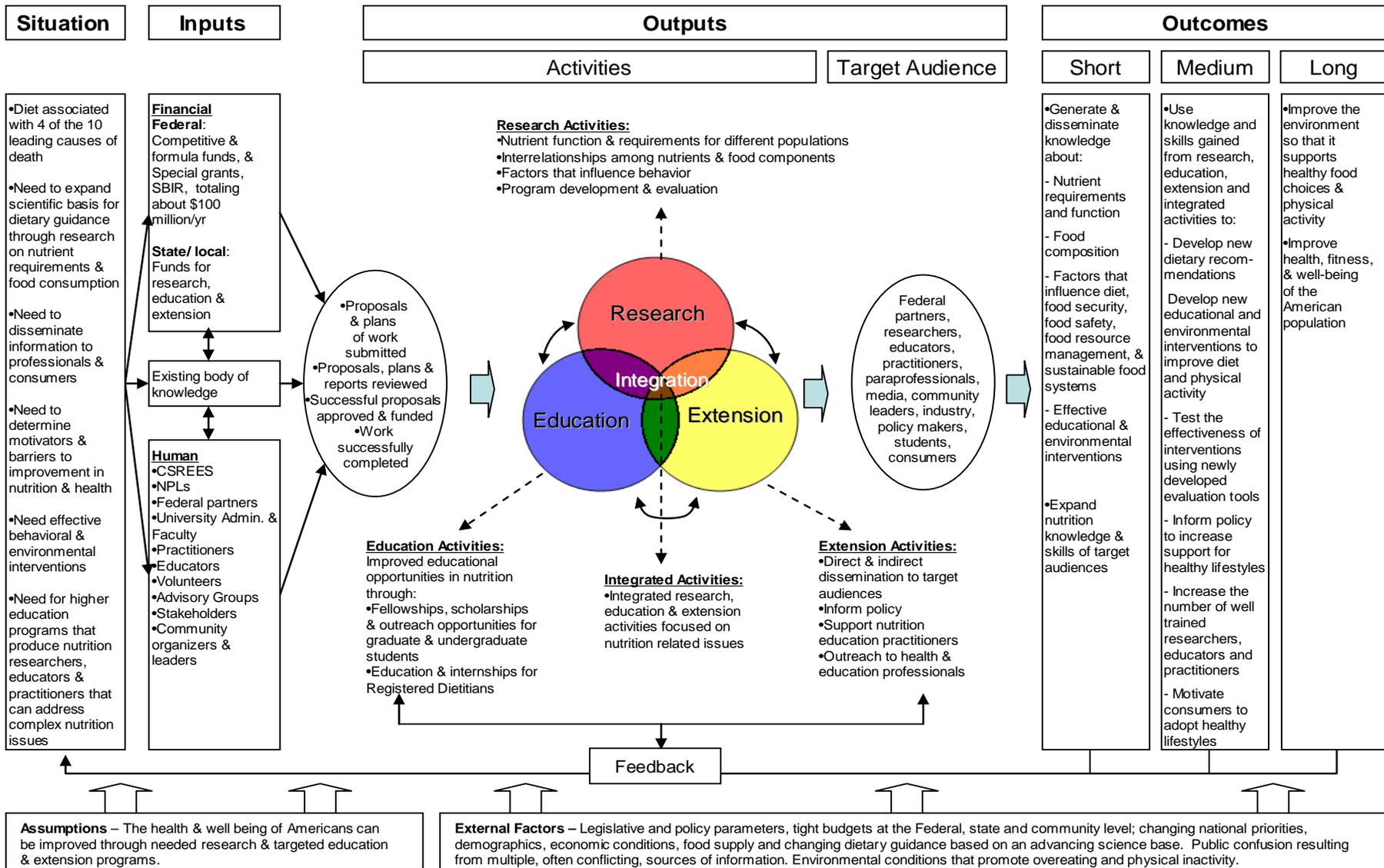
The Overview section of this chapter described the composition of the Nutrition Portfolio. It explained that Portfolio 4.1—“Improve human health by better understanding the nutrient requirements of individuals and the nutritional value of foods”—and Portfolio 4.2—“Promote healthier food choices and lifestyles”—are presented together because of the strong integration and interdependence of their component parts. The following sections of this report represent CSREES’ self-assessment of the work that has been done over the past five years (2000-2004). Both Chapter II, which highlights the combined Portfolios, and Chapter III, which presents the component parts, follow the outline of the logic model in textual and graphical format. The discussion of the Portfolio and its major components and their integration and flow to produce results is organized according to the following major headings:

- Situation
- Assumptions
- External factors
- Inputs
- Major themes
 - Outputs

- Outcomes
 - Short
 - Medium
 - Long term
- Success stories
- New directions

A comprehensive logic model for the integrated Nutrition Portfolio is found below. It illustrates the information presented in this section. The text that follows provides greater detail for each part of the model - situation, inputs, outputs and outcomes. This same format is used in Chapter III to introduce and guide discussion for each Portfolio.

Nutrition Portfolio



SITUATION

There are several broad areas that need attention if CSREES is to successfully move towards the goal of Improving the Nation's Nutrition and Health. First, there needs to be movement towards increasing understanding of the requirements and functions of nutrients and other food components so that appropriate recommended intakes can be established. Special attention needs to be paid to the nutrients and food components that have important biological functions in relation to maintaining health and preventing diet-related diseases. Second, information related to food composition and nutrient bioavailability needs to be continually updated. The food supply is constantly changing as many new foods are introduced annually and this requires systematic attention to new information so that appropriate dietary recommendations can be made. However, knowing what we should eat is not enough to change behavior and the third area in which attention needs to be focused is on research that will improve understanding of the motivators and barriers to behavior change. Such research requires the clear integration of the biological and social sciences. With this information, research can be undertaken to develop and test effective interventions. CSREES has traditionally been involved in educational interventions directed to individuals and groups. However, as research shows the effect of communities and the environment on health related behavior, interest in developing community and environmental interventions has increased. While over consumption is a problem for many Americans, hunger and malnutrition remain problems for some others. Finally, CSREES needs to support educational systems that will better prepare researchers and educators to address the complex multifaceted issues in nutrition.

ASSUMPTIONS

CSREES strives to "Improve the Nation's Nutrition and Health" with a synergistic combination of research, education and extension programs. We assume that the nutrition, health and physical fitness of Americans will improve as a result.

EXTERNAL FACTORS

There are many external facilitating and hindering factors outside the control of CSREES that may affect progress in working toward the goal of "Improving the Nation's Nutrition and Health." It is important to note these factors for planning purposes in order to mitigate or leverage their influence, as well as for evaluation purposes. Key external factors that may influence all of CSREES programs were noted in the CSREES Strategic Plan (<https://nifa.usda.gov/resource/nifa-strategic-plan-fy2014-fy2018>): 1. Weather and other growing conditions at home and abroad; 2. Costs to implement advances (knowledge, techniques, inventions, etc.); 3. Domestic and international economic factors, including consumer purchasing power, the strength of the U.S. dollar and competing currencies, and price volatility; 4. National and foreign policy and political changes; 5. Increasing world population and attendant increases in demand for agricultural products; 6. The accidental or intentional introduction of foreign diseases and hazardous agents, and emerging and re-emerging pests and diseases, affecting plants, animals, and humans; 7. Food choices made available and advertised to consumers by producers. In addition there are external factors that have a more direct impact on nutrition programs:

- Legislative authorities and program polices define program parameters.
- Budgets at the Federal, state, and community level for nutrition research, education and extension/outreach programs define program reach.
- National priorities, policies and regulations are redirected from health issues during difficult times such as war, natural disasters or economic challenges.
- Competing programmatic needs within CSREES can influence the direction of funding.

- Population changes, including immigration, movement from rural areas to cities and the aging of the population, drive the need for further research and more targeted intervention programs.
- Although public interest in nutrition is high, people are often looking for quick, easy solutions to complex problems. In addition, they are constantly bombarded with nutrition messages, much of which are out of context, misleading or incorrect.
- Insufficient intakes of certain nutrients and food components coexist with excess intakes of other nutrients and food components in the population.

INPUTS

Human Inputs

The CSREES nutrition staff consists of the nine nutritionists identified in the Executive Summary and at the beginning of this chapter. Although the number of CSREES nutritionists is small, the network of Federal and university partners and community partners is large. At the Federal level, CSREES connects with work going on inside USDA and within HHS through two Nutrition Coordinating Committees – one chaired by USDA and one chaired by HHS - and through the Dietary Guidance Working Group. This group reviews all nutrition education materials produced by USDA and HHS for accuracy and consistency with the Dietary Guidelines for Americans. CSREES stays connected with the Institute of Medicine by membership on advisory committees and with professional associations through service on various committees. CSREES considers its association with its university partners its most important resource. Connections are made through oversight and post award management of grants and Hatch-funded projects. CSREES leads panels consisting largely of university people for the review of research proposals and for the review of university nutrition departments. CSREES provides support to the Association of Nutrition Departments and Programs which includes Nutrition and Food Science county-based department chairs from land-grant and non land-grant universities. The Cooperative Extension System (CES) is the most important network for developing educational and environmental interventions to help people improve their diet and physical activity. This network extends from the Federal office to state specialists at land-grant universities to nutrition educators and paraprofessionals in communities across the country. CSREES also takes advantage of its ties with its partners by seeking their input especially on the direction of future work. Numerous list-serves and professional associations keep the partners connected. One of the strengths of the Cooperative Extension System is that it allows for effective coordination with local community leaders through its county offices creating an even larger network of partners.

Existing Body of Knowledge

Nutrition as a science is relatively new – starting a little more than 100 hundred years ago. The body of knowledge that has been established over this time is the basis of CSREES’s work in nutrition. Researchers try to learn more and educators and practitioners develop educational and environmental interventions based on current knowledge. In order to keep up with a constantly expanding body of knowledge, periodic, systematic reviews of the state of knowledge are conducted by several authoritative groups. The Institute of Medicine (IOM) of the National Academy of Sciences periodically updates the Dietary Reference Intakes (DRI) – the numerical standards for nutrient intakes. Work carried out throughout the world and work supported by CSREES in KA 702 “Requirements and Functions of Nutrients and Other Food Components” is used to develop the DRI. A Federal Advisory Group, of which CSREES is a member, provides input for the DRI development process. The DRI are used in evaluating the nutritional status of the population and in setting policy for nutrition labeling, food assistance programs and dietary guidance. The Dietary Guidelines for Americans which is based on the DRI and data on food composition (KA 701) translates the standards for nutrient intake into recommendations for food intake. USDA and HHS update the Guidelines every five years. They become the basis for all nutrition intervention programs. In using the DRI and Dietary Guidelines nutrition educators and

practitioners are assured that they are using up-to-date information representing the consensus of experts in the field.

Advancing the body of knowledge in the broad field of agriculture is a goal of CSREES. The agency strives to do this through its strong interactions with the university system.

In an effort to enhance the research, education and extension efforts of land grant universities, CSREES, at the request of cooperating institutions, facilitates reviews of institutions, departments, programs, or issues. Reviews are not mandated by federal statutes or required by CSREES, but the agency places high priority on them when allocating staff time and resources. The Nutrition Team most often conducts reviews of research, education and extension activities in departments of nutrition or food science and nutrition or of colleges of human ecology. During the period of 2000-2004, seven reviews were conducted by the Nutrition Team at:

- Rutgers University, March 2000
- University of Illinois, May 2000
- University of Vermont, March 2001
- University of Minnesota, February 2003
- University of Maine, April 2003
- Louisiana State University, April 2003
- University of Connecticut, September 2003

Financial Inputs

Tables 1-4 show the funds and the number of projects for research and integrated research, education and extension projects as reported by Agricultural Experiment Stations and classified in the Current Research Information System (CRIS) under KA 701-*Nutrient Composition of Food*; KA 702-*Requirements and Functions of Nutrients and other Food Components* and KA 703- *Nutrition Education and Behavior*. KA 704 - *Nutrition and Hunger in the Population* is a new classification that has not yet been used to classify projects. Projects that might have been coded as KA 704 are currently coded as KA 703. Data are not included here for non-research programs such as Cooperative Extension System programs, the Expanded Food and Nutrition Education Program, Food Stamp Nutrition Education and the Community Foods Competitive Grants program. Data for these are presented and discussed in Section III. However, the Science and Education Resources Development (SERD) and Small Business Innovation Research (SBIR) Programs are discussed in this Section because they cut across and support all of the KAs. The data in Tables 1-4 are generated by CRIS. This is the USDA's documentation and reporting system for ongoing and recently completed research and education projects in agriculture, food and nutrition, and forestry. Projects are conducted or sponsored by USDA research agencies, state agricultural experiment stations, the state land-grant university system, other cooperating state institutions, and participants in a number of USDA-administered grant programs, including SBIR, and National Research Initiative (NRI), and the programs administered by SERD. Funding from all other Federal agencies is also recorded, only if it is reported through Agricultural Experiment Stations. Therefore, large portions of nutrition research funded through HHS and the National Science Foundation (NSF) are not included in CRIS. CRIS contains over 30,000 descriptions of current, state and federally supported projects. More detailed tables showing funding sources and information for human nutrition research are included in the Evidentiary Materials.

Table 1 shows the major sources of funding tracked through CRIS for KAs 701, 702 and 703 together by funding source for 2000 to 2004. The largest proportion of the total funds comes from state appropriations. The marked difference in CSREES funding between the first two years shown and the later years reflects the presence of the Initiative for Future Agriculture and Food Systems (IFAFS) in 2000 and 2001. The discontinuance of this funding had a negative effect on the percentages of total funds coming from CSREES in the later years. Although more funding was made available for the NRI in FY 2003, the funds were not expended until FY 2004. This accounts for the increase in CSREES funding in

2004 compared to the previous two years. Additionally, in 2004 increases from each of the other three funding sources contributed to the largest funding total of the period. Funding from CSREES dedicated to human nutrition research as percent of the total decreased from 41% in 2000 to 24% in 2004 with an overall contribution of 29% for the five-year period. However, during this period, total dollars dedicated to all nutrition knowledge areas increased by 24 % from \$67,035,000 to \$82,999,000. This is indicative of the ability of CSREES partners to seek alternative funding and leverage appropriately.

Table 1: Funding for KAs 701, 702 and 703 by Source, 2000-2004

Funding Source	Fiscal Year (<i>in thousands</i>)					Total
	2000	2001	2002	2003	2004	
CSREES	\$ 27,403	\$ 27,954	\$14,748	\$14,993	\$20,174	\$105,272
Other Federal	\$ 11,307	\$ 14,099	\$16,518	\$16,504	\$22,404	\$ 80,832
State Appropriations	\$ 18,880	\$ 22,160	\$23,455	\$21,905	\$23,965	\$110,365
Private or Self Generated	\$ 9,445	\$ 10,275	\$12,010	\$13,115	\$16,456	\$ 61,301
Total	\$ 67,035	\$ 74,490	\$66,731	\$66,518	\$82,999	\$357,773
CSREES as % of total	41%	38%	22%	23%	24%	29%

Table 2 shows the funding sources within CSREES for KAs 701, 702 and 703 together for 2000 to 2004. The total amount of CSREES funding decreased from \$27,403,000 in 2000 to \$20,174,000 in 2004. While there is a decline in funding in most areas, the big difference is in the CSREES category. Again, this reflects the short period of time the IFAFS grants program was in existence. In 2003 and 2004, a small amount of funding was provided from McIntire-Stennis and Animal Health grants for research in KAs 701 and 702, respectively. These sources of funding do not usually focus on nutrition issues, but for these two years work on dairy foods, such as eggs, was funded through the Animal Health program and work on forest related plants, such on mushrooms, was funded through the McIntire-Stennis program. Funding for grants awarded through SERD was not recorded in CRIS until 2003 and in this table they are recorded as “Other CSREES.” Funding for SBIR grants is shown here and, in more detail, in the Major Theme area. NRI funding dedicated to obesity increased in 2003, but the funds were not expended until FY 04. It should be noted that Federal funds from CSREES are estimated to be leveraged by a ratio of at least \$2 of non-federal funds for every \$1 of CSREES funding. This leveraging provides expanded fiscal resources for nutrition programs.

Table 2: CSREES Funding for All KAs 701,702 and 703 by Source, 2000-2004

Funding Source	Fiscal Year (<i>in thousands</i>)					Grand Total
	2000	2001	2002	2003	2004	
Hatch	\$ 3,631	\$ 4,242	\$ 4,017	\$ 4,013	\$ 3,943	\$ 19,846
Mc-Stn	\$ 0	\$ 0	\$ 0	\$ 3	\$ 4	\$ 7
Evans Allen	\$ 2,413	\$ 2,612	\$ 2,412	\$ 2,289	\$ 2,350	\$ 12,076
Animal Health	\$ 20	\$ 23	\$ 0	\$ 1	\$ 9	\$ 53
Special Grants	\$ 1,210	\$ 1,305	\$ 2,865	\$ 3,461	\$ 3,676	\$ 12,517
NRI Grants	\$ 5,211	\$ 5,767	\$ 4,266	\$ 4,596	\$ 9,303	\$ 29,143
SBIR Grants	\$ 260	\$ 271	\$ 232	\$ 52	\$ 240	\$ 1055
Other CSREES	\$14,659	\$13,735	\$ 956	\$ 577	\$ 649	\$ 30,576
Total CSREES	\$27,403	\$27,954	\$14,748	\$ 14,993	\$20,174	\$105,272

Table 3 below shows CSREES funding for each KA – 701, 702 and 703. The considerably higher funding for KA 703 Nutrition Education and Behavior in 2000 and 2001 reflects the presence of IFAFS funding and in 2004 reflects the increase in NRI funding. KA 702, Requirements and Functions of Nutrients and Other Food Components, has traditionally been the focus area for nutrition research in CSREES as noted by the grand total for the five-year period. However, the emphasis on obesity-related behavioral research in 2004 changed the funding distribution. CSREES research that is coded KA 701 is usually a small but essential component of research carried out in KA 702. For example, researchers may need to determine the nutrient content of foods to study a nutrient’s bioavailability and function. Food composition research is a major focus of work in ARS, CSREES’s sister agency. ARS maintains the National Nutrient Data Laboratory and nutrient databases used in national food consumption surveys.

Table 3: CSREES Funding for Each Knowledge Area, 2000-2004

Knowledge Areas	Fiscal Year (<i>in thousands</i>)					Grand Total
	2000	2001	2002	2003	2004	
701-Nutrient Composition of Food	\$ 1,458	\$ 2,321	\$ 2,506	\$ 2,752	\$1,978	\$11,015
702-Requirements and Functions of Nutrients and Other Food Components	\$13,758	\$14,610	\$ 7,796	\$ 8,516	\$7,317	\$51,997
703- Nutrition Education and Behavior	\$12,188	\$11,024	\$ 4,445	\$ 3,726	\$10,879	\$42,262
Grand Total	\$27,404	\$27,955	\$14,747	\$14,994	\$20,174	\$105,274

Table 4 shows the number of projects found in CRIS that address, at least in part, KA 701, 702 and 703. Since projects may address more than one KA, they may also be counted more than once. The numbers of projects addressing the KA 702 - *Requirements and Functions of Nutrients and other Food Components* is more than double the numbers of projects addressing the other KAs. Between KA 703 – *Nutrition Education and Behavior* and KA 701 - *Nutrient Composition of Food*, the difference in dollars is greater than the difference in the numbers of projects. Since projects coded as addressing food composition tend to be small parts of larger projects that focus primarily on nutrient requirements and function.

Table 4: Number of Projects within each Knowledge Area, 2000-2004

Knowledge Area	Number of Projects
701 – Nutrient Composition of Food	541
702 – Requirements and Functions of Nutrients and Other Food Components	1478
703 – Nutrition Education and Behavior	755

Table 5 and Appendix Table 1, in more detail, show the average annual appropriation, over the 5 year period from 2000 to 2004, for nutrition research/education and Extension/outreach. Other funds such as state appropriations for EFNEP, FSNE and Community Food Projects or FNS funds for FSNE are not included in Table 5. The table only includes funds appropriated to CSREES for formula and competitive

programs and special grants. The total average appropriation for CSREES nutrition programs is approximately \$101 million. This is slightly less than 10% of the total average annual appropriation of \$1 billion for CSREES over this time period. Most of the nutrition appropriation is for Extension/outreach programs, about \$80 million compared to about \$21 million for research/education. Most of the Extension/outreach appropriation is for EFNEP—about \$57 million. The next highest amount for Extension/outreach is for CES in the 1862, 1890 universities and Tuskegee - about \$18 million. Very few of the funds for Extension/outreach are awarded competitively – about 5%. On the other hand, almost 60% of the much smaller appropriation for research/education is awarded competitively.

Table 5: CSREES Funding for Nutrition Portfolio¹

Funding	5 year Annual Average \$ in thousands per yr
Research and Education	
Non-competitive ²	8,901.65
Competitive Funds ³	12, 185.00
Total, Research and Education	21,086.65
Extension/Outreach	
Non-competitive CES	
1862 ⁴	16,660.80
1890 and Tuskegee ⁴	1,810.80
Subtotal	18,471.60
EFNEP ⁵	57,413.80
Total	75,885.40
Competitive	
FSNE ⁵	94.40
Community Food Projects ⁵	3,720.00
Total	3,814.40
Total, Extension/Outreach	79,699.80
Total, Nutrition Portfolio	100,786.45
Total, CSREES	1,045,959.00
Nutrition Portfolio as % of total CSREES	9.6%

¹ Research funds based on CRIS data fro KA 701, 702 and 703.

² Includes Hatch, MacIntire Stennis, Evans Allen, Animal Health and Special Grants

³ Includes NRI, SBIR, IFAFS for 2000 and 2001, and SERD for 2003 and 2004

⁴ Based on an estimate of 6.016% of total Extension funds going to nutrition.

⁵ Does not include funds from FNS or the states.

NEW DIRECTIONS FOR THE OVERALL NUTRITION PORTFOLIO

Gathering stakeholder input concerning the future direction of the overall CSREES nutrition research, education and extension program is a continuous and dynamic process.

In addition, for each individual and crosscutting program there are specific mechanisms for gathering stakeholder input which are discussed in relation to those programs.

Generally there are three primary mechanisms by which stakeholder input is gathered – National Advisory Boards, formal and informal stakeholder meetings, and the normal flow of information among federal, state and county offices.

The 1996 Farm Bill established the National Agricultural Research, Extension, Education, and Economics (NAREEE) Advisory Board to give advice to the Secretary of Agriculture and land grant universities on national priorities and policies related to agricultural research, education, extension, and economics. This 31 member panel meets on a regular basis (www.nareeeab.com/). Nutrition and, in particular, obesity have been the focus of several meetings and continues to be of concern to the panel. In general, the NAREEE Advisory Board has recommended that CSREES take a strong leadership role in integrating research, education and extension activities and that the Agency increase its visibility in these activities. The Advisory Board also recommended that we take an interdisciplinary approach to addressing nutrition issues and that we continue to collaborate with other agencies and organizations, both public and private. These are recommendations the CSREES nutrition team believes are currently being carried out and which it plans to follow closely in the future. In the immediate future, CSREES can take a leadership role in increasing the visibility of the Cooperative Extension System in preventing obesity by identifying and sharing information about effective educational and environmental interventions. Other areas where CSREES can play an important role are in ensuring that supported research addresses the needs of educators and practitioners and that higher education programs meet the challenge of producing leaders who can address complex problems like obesity.

The nutrition team has been involved in several formal stakeholder meetings intended to provide input for the direction of the program:

- In September 2001, the conference “Nutrition Education for Diverse Audiences II: Integrating Research and Practice.” was held to focus specifically on research needed by practitioners who work with the low-income and minority populations. This conference brought together coordinators and leaders from the EFNEP, FSNE and other nutrition education programs with researchers involved in nutrition education research, food choice behavior and physical activity as well as representatives from various government entities. There were opportunities to share existing materials, strategies and resources, and networking time for building better understanding and partnerships for increased collaboration. This has led to increased participation in integrated research, education and extension teams, such as the multi-state effort on improving calcium intakes in pre-adolescents (W-1003) and several integrated obesity projects.
- In October, 2002 a public listening session was held in Kansas City to seek feedback on existing research, education and extension programs in nutrition and other consumer oriented areas. Information from those providing testimony was compiled for the various topic areas. It was later used in reports about program accomplishments as well as for developing new program direction.
- Starting in 2004, National Program Leaders involved in competitive grants programs have been hosting meetings for awardees of the NRI integrated obesity program. Awardees have presented their progress and provided advice concerning future directions. These meetings are proving to be

an excellent means of fostering collaboration and community among researchers, educators and practitioners.

- Several more informal meetings have also been held where leaders in the field have been invited to come and spend some time with the Nutrition team to dialogue about its programs. Participants who have been supportive as well as those who have been critical of CSREES programs in the past were included.

The nutrition team of CSREES is committed to continuing to seek stakeholder input and to implementing applicable recommendations. Our stakeholder and the Federal administration have clearly indicated that obesity is a problem that must be addressed. The nutrition team is committed to using its resources to do that. Because of its partnership with the university system, CSREES is in a unique position to drive multidisciplinary, integrated research, education and extension approaches to the problem. The nutrition team is currently looking for creative ways of identifying and sharing Cooperative Extension System interventions that are successfully addressing obesity. This should extend the use of successful programs and raise the visibility of the Cooperative Extension System. The nutrition team is also exploring ways to better integrate Higher Education programs and competitive grant programs. Current instructions for those writing research proposals strongly encourage the inclusion of support for students in budget requests, but a more structured and direct way of coordinating these programs is desired. Greater coordination between these programs is part of an overall goal for greater coordination between all of our programs to address important crosscutting issues. The nutrition team envisions the collaborations that have been started to address the crosscutting problem of obesity will grow and create a synergy that benefits all CSREES nutrition programs.

Cross-Cutting Programs

OVERVIEW

Three cross-cutting major themes are presented in this section because they support work in all KAs. These include CSREES's work in (a) Higher Education in Human Nutrition, Nutritional and Food Sciences; (b) Small Business Innovation Research (SBIR); and (c) Obesity Prevention. Obesity prevention is highlighted because of the importance of the problem and the multiple facets with which CSREES can address the problem. Figure 8 below shows the cross-cutting areas of work in Portfolio 4.1 and 4.2. Figure 9 below shows examples of accomplishments and future needs in each of the areas.

Figure 8 is a honeycomb model representing cross-cutting programs for the nutrition portfolio. In this case the whole represents the possible Cross-Cutting Programs which span Portfolios 4.1 and 4.2. The smaller honeycombs represent the three identified cross-cutting programs featured in this review. This graphic is meant to serve as a tool to highlight one accomplishment (success story) and one related area of need (new direction) for each cross-cutting program. It is meant to be an outline which introduces the reader to what will be discussed in depth throughout the text and is not an all inclusive sample.

Figure 8

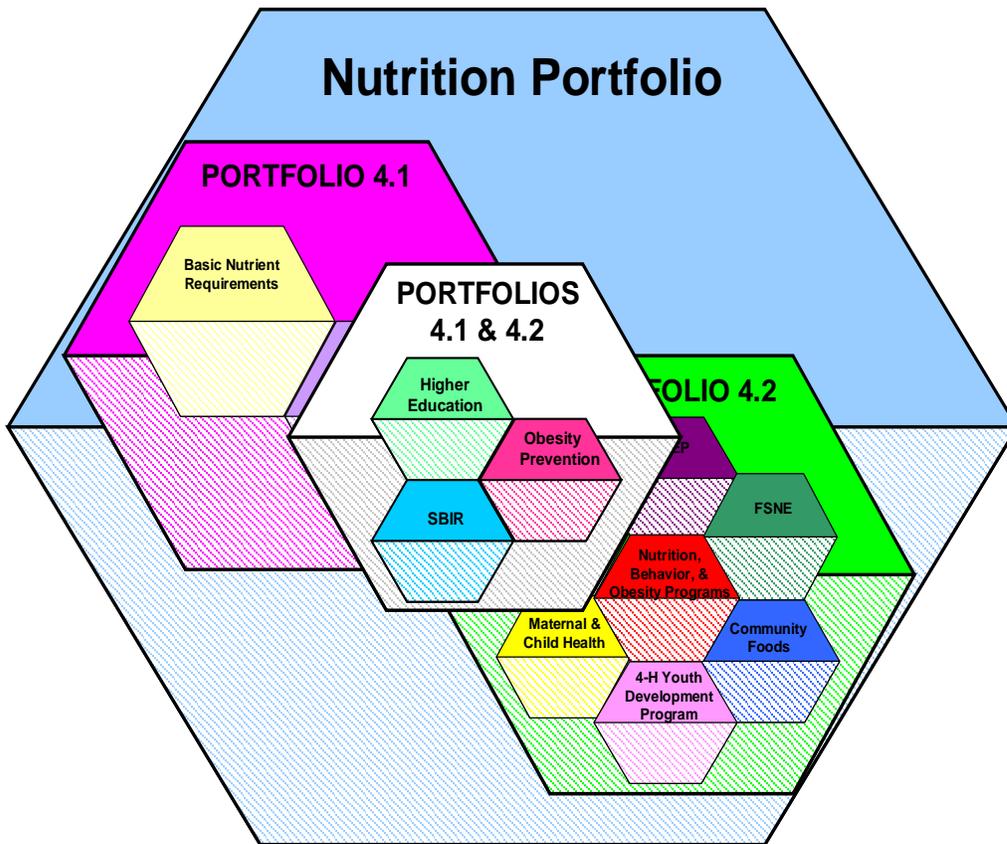
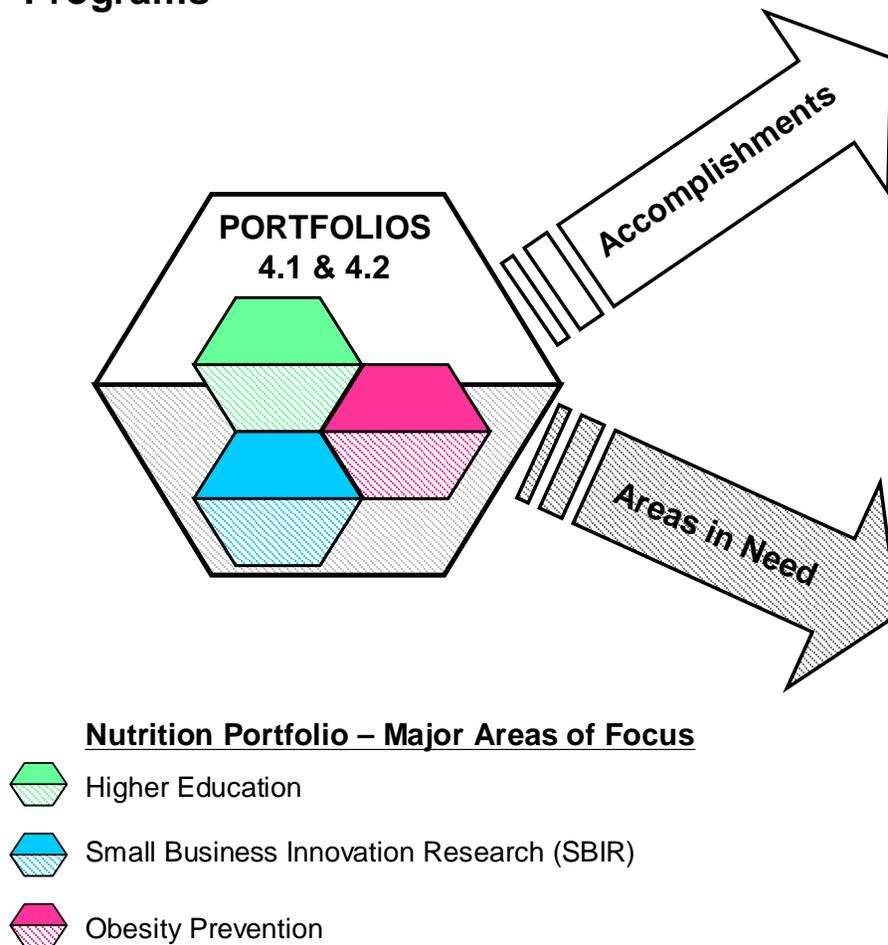


Figure 9

Portfolios 4.1 and 4.2 – Cross Cutting Programs



- A Summer Scholar's Program that exposed undergraduate students to research in food science was favorably evaluated by participants, a number of whom entered careers in food-related industries.
- A small business developed and evaluated a CD-ROM for teachers to use in integrating nutrition into classroom curricula in math, science, social studies and language arts.
- A small study showed that long term weight loss could be achieved by using a non-diet approach which emphasized eating in response to physiological cues and enhancing body acceptance.

- Secondary schools need to work with community colleges and universities to bring food and nutritional sciences into the classroom early on in a student's education.
- The SBIR program should be used to enhance the transfer of technology developed from other CSREES-supported research and integrated programs into real world uses.
- CSREES should capitalize on the synergy to be gained by strengthening the complementarities among the many CSREES programs that address obesity in various ways.

A. HIGHER EDUCATION IN HUMAN NUTRITION, AND FOODS AND NUTRITIONAL SCIENCES

Currently, the United States must combat the problems of poor food choices, overweight and obesity, physical inactivity and associated chronic diseases, such as diabetes, hypertension, and cardiovascular disease in both children and adults. Therefore, there is an ever-increasing need for higher education programs that can produce nutrition educators and researchers able to address the existing multifaceted diet and health problems facing the nation. Additionally, higher education programs need to provide adequate grounding in those communication skills necessary to translate scientific findings on human nutrition into practical applications supportive of healthy behaviors and lifestyles. CSREES, in cooperation with public institutions, private sector partners, and the Land-Grant University System, encourages higher education human nutrition disciplines to recognize current public health concerns and support a multi-disciplinary approach towards enhancing nutrition curricula and programs. The education of students in human nutrition is supported through NRI research funding. Research projects supported by CSREES frequently include financial support for graduate students, postdoctoral researchers and sometimes for undergraduate students to work on human nutrition research and integrated projects. Also, university reviews of human nutrition, nutritional sciences and food science and technology departments) conducted by CSREES National Program Leaders and faculty from its Land Grant partners look carefully at faculty qualification and research interest, and student courses and preparedness in an concerted effort to strengthen university research, education and extension programs in nutrition. Such efforts also promote teaching excellence and enhance academic quality in an effort to improve tomorrow's scientific and professional workforce.

To this end CSREES' Science and Education Resource Development Unit (SERD) manages a broad portfolio of competitively awarded higher education programs with institutions in the food and agricultural sciences and oversees a range of programs enhancing teaching, curriculum, and human capital development in the food and agricultural sciences from kindergarten to postgraduate studies. SERD's grant programs strengthen agricultural and science literacy in K-12 education, influence student's career choices toward agricultural subjects, strengthen higher education in the food and agricultural science, and train master's and doctoral-level students as future educators and scientists in agricultural sciences, to include human nutrition and health. Success stories of related activities are presented later in this section. SERD also provides national leadership for revitalizing curricula, recruiting and retaining new faculty, expanding faculty competencies, developing research and teaching capacity at minority-serving institutions, and increasing the diversity in the food and nutritional science work force. In addition, SERD manages the Food and Agricultural Education Information System (FAEIS), allowing for the collection and compilation of a broad range of information, including numbers of students enrolled in, and graduating from, degree programs in the food and agricultural sciences, including science and nutrition, nutritional sciences and closely allied health fields. This information, some of which is presented below, is useful for planning, benchmarking, and coordinating efforts—both within higher education and throughout broad employment sectors in the food science, nutrition and allied health fields.

Data on SERD grant/financial obligations are classified under 'Research Grants' in CRIS. CRIS data on SERD funding are not available prior to 2003 nor are they available specifically for each of the human nutrition knowledge areas (See Table 5, p. 53, CSREES Funding for Human Nutrition Research (701, 702, 703), by Source during 2000-2004). More information on SERD funding may be found in the Portfolio Review for KA 903.

Table 6: Number of Degrees in Foods and Human Nutrition Studies and as Percent of Total Degrees Awarded in 1999-2002 by Institutions of Higher Education

Discipline	1999-2000			2000-2001		
	<u>BS</u>	<u>MS</u>	<u>PhD</u>	<u>BS</u>	<u>MS</u>	<u>PhD</u>
Food and Nutrition Studies ⁶	3,959	642	44	3,592	671	54
Nutritional Sciences	476	329	125	479	428	99
Food Sciences and Technology	672	270	148	632	255	138
TOTAL DEGREES AWARDED, IN DISCIPLINE	5,107	1,241	317	4,703	1,354	291
TOTAL DEGREES AWARDED, ALL	1,237,875	457,056	44,808	1,244,171	468,476	44,904
Percentage Food and Nutritional degrees of total	.40	.27	.70	.30	.30	.66

Source: U.S. Department of Education, National Center for Education Statistics; 2002

FAEIS (Food and Agricultural Education Information System) Database

⁶ Includes Foods and Nutrition Studies, General; Foods and Nutrition Studies, other; Foods and Nutrition Sciences; Dietetics/Human Nutritional Sciences; Food Systems Administration.

Table 7: Number of Degrees in Foods and Human Nutrition Studies and as Percent of Total Degrees Awarded in 1999-2002 by Institutions of Higher Education (contd.)

Discipline	2001-2002		
	<u>BS</u>	<u>MS</u>	<u>PhD</u>
Food and Nutrition Studies	3,364	626	56
Nutritional Sciences	417	398	100
Food Sciences and Technology	607	288	132
TOTAL DEGREES AWARDED, IN DISCIPLINE	4,388	1,312	288
TOTAL DEGREES AWARDED, ALL	1,219,900	482,118	44,160
Percentage Food and Nutritional degrees of total	.36	.27	.65

Source: U.S. Department of Education, National Center for Education Statistics; 2002

FAEIS (Food and Agricultural Education Information System) Database

Table 8: Number of Degrees in Foods and Human Nutrition Studies and as Percent of Total Degrees Awarded in 1999-2002 by Institutions of Higher Education

Discipline	1999-2000			2000-2001		
	BS	MS	PhD	BS	MS	PhD
Home Economics, General	2,751	367	55	2,653	381	60
Family and Community Studies	454	96	0	462	84	0
Family/Consumer Resource Management	1,589	77	14	1,613	65	20
TOTAL DEGREES AWARDED, IN DISCIPLINE	4,794	540	69	4,728	530	80
TOTAL DEGREES AWARDED, ALL	1,237,875	457,056	44,808	1,244,171	468,476	44,904
Percentage Home Economics and Family and Community Studies degrees of total	.39	.10	.15	.40	.10	.18

Source: U.S. Department of Education, National Center for Education Statistics; 2002

FAEIS (Food and Agricultural Education Information System) Database

Table 9: Number of Degrees in Foods and Human Nutrition Studies and as Percent of Total Degrees Awarded in 1999-2002 by Institutions of Higher Education (cont'd)

Discipline	2001-2002		
	BS	MS	PhD
Home Economics, General	2,858	340	62
Family and Community Studies	490	88	1
Family/Consumer Resource Management	1,597	73	14
TOTAL DEGREES AWARDED, IN DISCIPLINE	4,945	501	77
TOTAL DEGREES AWARDED, ALL	1,219,900	482,118	44,160
Percentage Home Economics and Family and Community Studies degrees of total	.40	.10	.17

Source: U.S. Department of Education, National Center for Education Statistics (NCES); 2002.

FAEIS (Food and Agricultural Education Information System) Database

Source: U.S. Department of Education, National Center for Education Statistics (NCES); 2002.
FAEIS (Food and Agricultural Education Information System) Database

Table 7 (Foods and Human Nutrition) presents data specifically for Foods and Human Nutrition degrees awarded during 1999-2002, the latest period for which data is available. Table 8 (Home Economics and Family Community Studies) presents data for degrees awarded in Home Economics and Family Community Studies during that time. These tables contain data from the National Center for Educational Statistics (NCES), Department of Education. The data show the official numbers of graduates in the selected programs offered by the institutions in the United States receiving Federal Financial Aid. Data on Home Economics and Family Community Studies are included here in part to show the scope and diversity of nutrition-related disciplines. Also, Home Economics and Family Community Studies curricula and courses are often closely related to or overlap with components of foods and human nutrition programs. Thus, it will be useful to review these data and consider how these disciplines may in fact compete with the Foods and Human Nutrition disciplines for students, especially at the undergraduate level.

A look at the number of Foods and Human Nutrition degrees awarded in 1999-2002 (Table 7) shows Food and Nutrition Studies, led the way in number of Bachelor of Science degrees awarded, followed by Food Sciences and Technology, and then Nutritional Sciences. Bachelor's degrees awarded in Food and Human Nutrition between 1999 and 2002 decreased 14%. During this period, Master's Degrees were conferred at a rate of 25-30% (depending on year) those of Bachelor of Science degrees with Food and Nutrition Studies led the way followed by Nutritional Sciences and lastly Food Sciences and Technology. During 1999-2002, the number of Doctorate of Philosophy degrees, equaled 6% of that of the Bachelor's Degree and was highest for Food

Sciences and Technology followed by Nutritional Sciences. The number of doctorates awarded decreased somewhat over the period from 148 to 132 and 125 to 100, respectively.

A look at the number of Home Economics and Family Consumer Sciences degrees awarded in 1999-2002 (Table 9) shows Home Economics led the way in number of Bachelors of Science degrees awarded, followed by Family/Consumer Resource Management, and then Family and Community Studies. Bachelor's degrees awarded in total for these three disciplines between 1999 and 2002 increased 3%, a positive trend not seen for Foods and Human Nutrition Bachelor's of Science degrees. During this period, Master's Degrees were conferred at a rate of 10-11% (depending on year) of those of Bachelor of Science degrees with Home Economics leading the way followed by Family/Consumer Resource Management and lastly Family and Consumer Studies. During 1999-2002, the award of the Doctorate of Philosophy degree was conferred at a very low rate of less than 2% of that of the Bachelor Degree for the total of three disciplines.

Table 10A: Numbers of Degrees Awarded from 1991-1992; and 1999-2002 in Other Disciplines Related to Human Nutrition

Discipline	1991-1992			1999-2000		
	BS	MS	PhD	BS	MS	PhD
Health and Physical Education, General	1,280	393	13	5621	649	43
Health and Physical Education, Fitness	138	85	10	407	102	6
Medical Education	0	0	0	0	25	0

Source: U.S. Department of Education, National Center for Education Statistics (NCES)

Table 10B: Numbers of Degrees Awarded from 2000-2001; and 1999-2002 in Other Disciplines Related to Human Nutrition

Discipline	2000-2001			2001-2002		
	BS	MS	PhD	BS	MS	PhD
Health and Physical Education, General	5,609	669	51	6041	739	37
Health and Physical Education, Fitness	419	76	15	568	86	11
Medical Education	0	25	0	3	25	0

Source: U.S. Department of Education, National Center for Education Statistics (NCES).

With consideration for human health and fitness disciplines, the integration of physical activity into nutrition research funded by CSREES, and the specialization or credentialing of some nutrition students in areas of physical fitness and medical health sciences, trend degree award information is included here for three disciplines with close ties to human nutrition-- General Health and Physical Education, Health and Physical Education, Fitness, and Medical Education. Table 10 above shows that from 1991-1992 to 2001-2002, a 10 year period, the number of Bachelor's of Science degrees awarded in both General Health and Physical Education, and Health and Physical Education, increased by fourfold. 2001-2002 was the first time that the Bachelor's of
Version: January 18, 2006

Science degrees were awarded in Medical Education and this is indicative of an interest and need for that specialty area. During the ten year period the number of Masters of Science degrees awarded almost doubled (393 to 739), and the number of Doctorate of Philosophy degrees awarded almost tripled (13 to 37) in General Health and Physical Education. Master of Science and Doctorate of Philosophy degrees awarded in Health and Physical Education, Fitness remained about the same (85 to 86, Masters and 10 and 11, Doctorates) during that time. However, the number of Master of Science degrees awarded in Medical Education increased from 0 to 25 during 1991-1992 to 1999-2000 and remained constant through 2002 (the last data point).

Table 11. Trends in number of Degrees Awarded in 1991-1992 and 1999-2002 in Foods and Human Nutrition and related Disciplines

Discipline	1991-1992			2001-2002		
	BS	MS	PhD	BS	MS	PhD
Food and Nutrition Studies	2,623	559	58	3,364	626	56
Nutritional Sciences	284	288	115	417	398	100
Food Sciences and Technology	449	306	133	607	288	132
Home Economics, General	3,064	303	42	2,858	340	62
Family and Community Studies	219	65	2	490	88	1
Family/Consumer Resource Management	1,124	54	17	1,597	73	14
Health and Physical Education, General	1,280	393	13	5,621	649	43
Health and Physical Education, Fitness	138	85	10	407	102	6

Source: U.S. Department of Education, National Center for Education Statistics (NCES)

Table 11 shows an increase in the number Bachelor of Science degrees awarded in these disciplines with the exception of Home Economics over the period. As previously mentioned the number of Bachelor's degrees awarded in the Health and Physical Education disciplines markedly increased. Generally, the award of graduate degrees increased across disciplines. Of notable exception is a 6 % decrease in the award of the Master's degree in Food Science and Technology and a 13 % decrease in the award of the Doctorate of Philosophy degree in Nutritional Sciences. These trends, especially those for Health and Physical Education, may help explain a corresponding decrease in the awarding of similar degrees in Food and Nutrition Studies from 1999 to 2002.

However, the finding that Food and Human Nutrition degrees make up less than 1% of total degrees awarded should be of concern to CSREES and its Land-Grant partners. This may be due in part to the life science emphasis and course work required by the human nutrition disciplines. Some students may lack the basic secondary schooling in the sciences required as prerequisites for human nutrition college or university courses. Also minority faculty members are critically needed to serve as role models for students. In particular, inadequacies in the pre-college environment have a major impact on underserved groups. A serious deficiency

in educational resources (e.g. well-prepared teachers, physical infrastructure, technological resources, and curriculum standards) prevents access to high-quality science and mathematics education for underrepresented minority students (Report of the Congressional Commission on Advancement of Women and Minorities in Science, Engineering and Technology Development, 2000).

This highlights the need to bring professionals into the biological sciences; a field closely linked to food and human nutrition studies. This need is considered particularly acute in underserved/underrepresented minority communities—African Americans, Hispanic, and Native Americans/Alaskan natives—in terms of their representation in food and human nutrition studies. For example, of nearly 62,000 Bachelors of Science degrees awarded in biological science in 2001, only 9,662 went to underrepresented minorities (National Science Foundation, April 2004. <http://www.nsf.gov/statistics/nsf04318/>). Likewise, of the 4241 new biological science PhDs in 2001 in the United States, only 319 went to underrepresented minorities (Table 10; National Science Foundation, April 2004 <http://www.nsf.gov/statistics/nsf0418/>). Biological science studies are important to the foundation of our society in terms of health and technological advances and are at the core of food and human nutrition curriculum. Therefore, it is particularly important that CSREES support its Land-Grant partners in an effort to remove the social and educational barriers to careers in nutrition and related disciplines for members of underrepresented groups. An example of how CSREES resources help to overcome this problem is that 25 Bachelor’s Degrees in Food and Human Nutrition Studies/Sciences were awarded by Historically Black Colleges and Universities/Land-Grant Universities during 2004. Over two-thirds thirds of these degrees were received by women. (Table 12 below)

Table 12. Selected Historically Black Colleges and Universities/ Land-Grant Universities awarding Bachelor’s Degrees in Food and Nutrition Studies/ Science, 2004

Institution	City	ST	Black Men	Black Women	Black total	Total Men	Total Women	Total
Delaware State University	Dover	Del	2	3	5	3	4	7
South Carolina State University	Orangeburg	SC	0	3	3	0	4	4
Fort Valley State University	Ft. Valley	GA	1	1	2	1	1	2
North Carolina A&T State University	Greensboro	NC	0	2	2	1	3	4
Prairie View A & M University	Prairie View	TX	1	1	2	1	3	4
Alcorn State University	Alcorn State	MS	0	1	1	0	1	1
Lincoln University	Jefferson city	MI	1	0	1	1	0	1
University of the District of Columbia	Washington	DC	0	1	1	0	2	2

Columbia								
Total			5	12	17	7	18	25

Source: Frederick D. Patterson Research Institute Analysis of Department of Education Integrated Postsecondary Education Data System (IPEDS), 2004

Evidence of this support is the financial assistance provided to students majoring in nutrition or related disciplines at colleges and universities through grant awards, particularly the NRI. This is indicated in Figures 10 and 11 which show fiscal support for student stipends through grants and awards in terms of years by KA (701&702; and 703). These results show the contributions of the NRI and in particular what the obesity program has done for graduate education in nutrition education area. However, an increased emphasis in this area continues to be needed towards the financial support of post-doctoral students. For KA 703 (nutrition education), CSREES supported a total of 24 graduate students for a total 526 months during 2000-2004—an average 1.8 years of support per student as well as six post-doctoral students for a total of 92 months—an average of 1.3 years per post-doctoral student. For KA 701-702 (food composition and requirements and nutrient functions), CSREES supported a total of 36 graduate students for a total of 924 months during 2000-2003—an average of 2.1 years of support per student. Also, 30 postdoctoral students were supported for a total of 744 months—an average of 2.1 years of support per post-doctoral student (note that due to delay in the NRI RFA, 2004 projects were not awarded until 2005 and therefore are not included in this analysis).

Figure 10: Graduate Students Supported by CSREES/NRI Nutrition Projects, 2000-2004

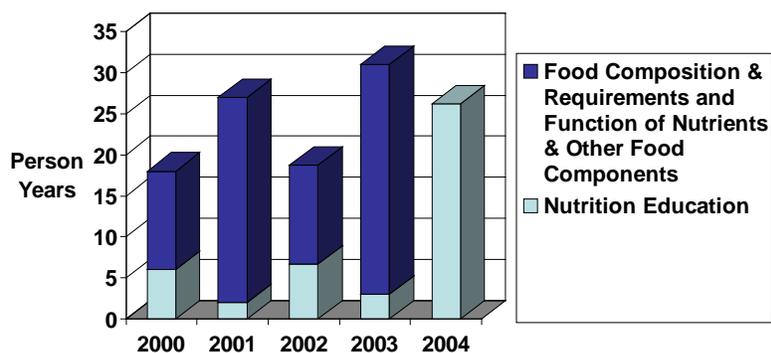
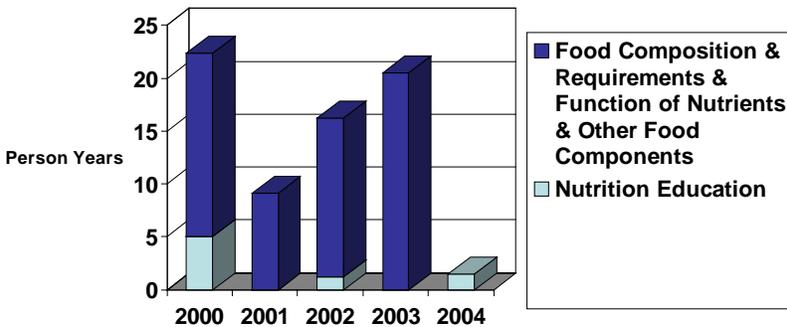


Figure 11: Postdoctoral Scholars Supported by CSREES/NRI Nutrition Projects, 2000-2004



Data collected by the National Science Foundation (NSF) from PhD graduates <http://www.nsf.gov/statistics/nsf05300/pdfstart.htm> at institutions across the United States offering PhD's are useful to look at future employment and career path of these graduates. Employment and career path data collected from PhD graduates as a voluntary survey and administered yearly by NSF receives approximately a 90% response rate <http://www.nsf.gov/statistics/srvydoctorates/>. Of particular interest to this Portfolio are results for two employment questions for the three disciplines related to human nutrition and food science — food engineering, food science, other and nutritional sciences. For the first question, “For what type of employer will you be working within the next year” many people in each of the disciplines had unknown employment plans (possible responses: unknown employment plans; US 4 yr college or university (not medical; Foreign Institution; Foreign Government; US Federal Government; Industry or Business). Also, it is not possible to determine if the response “Foreign Institution” was due to foreign students returning to country or a person took a foreign assignment. The category “Industry and Business” was the choice of employment for many people in each of the three disciplines, but especially for Food Engineering and Food Science graduates. More people in the nutritional sciences had career paths with U.S .college and universities than the other two disciplines, indicating a likely continuance of scholarship in human nutrition related fields. The Federal Government offered some career opportunity for each of the disciplines as well, but was not a primary employer choice for these doctoral graduates. For the second question, “How definite are immediate (within the next year) postgraduate plans?” (possible responses: unknown or not available; returning to or continuing in pre doctoral employment; signed contract/made definite commitment; negotiating with one or more specific organizations; Seeking appoint, but no specific prospects; other--housewife, writing a book, no employment), some people had unknown plans, but the majority had signed a contract with a definite commitment, or were negotiating such a commitment. In each discipline about 10-15% were returning to or continuing in pre doctoral employment, again indicating a likely continuance of scholarship in human nutrition related fields. As high as one-third of the people in each of the three disciplines throughout 1999-2003 were seeking appointments, but had no specific prospects lined-up for the future. In general, these responses should be considered by CSREES in as much as it may be a responsible and influencing body to ensure adequate educational preparation and/or funding sources leading to full employment wherever possible within its authority.

OUTPUTS

Educational activities in human nutrition, nutritional science and food science and technology are directed towards improving educational opportunities in these areas through fellowships and scholarships for students, internships for registered dietitians (RD), postdoctoral fellowships, and research training opportunities for graduate students. Additionally, the design and implementation of multidisciplinary programs to include human nutrition courses along with components of public policy, educational methods, behavioral theory,

communication technique, and exercise science or kinesiology are important for providing the higher education needed to train our future teachers, educators and researchers. The knowledge and insights gained through this multidisciplinary approach which also crosses education, research, extension and integrated projects expands the knowledge base for teaching the next generation of researchers, educators and practitioners.

While the bulk of the educational and research activities in human nutrition and the nutritional sciences discussed in this report are focused on undergraduate and graduate students in higher institutions of learning, the models of education are significantly wider within the KAs 701, 702 and 703. In particular, through extension and outreach activities a much larger and diverse audience is targeted for increasing nutrition awareness and changing lifestyle behaviors. This audience includes paraprofessionals, the consumer, the media, community leaders and even high school students.

OUTCOMES

Short Term

Secondary school students with links to community colleges, and college and university students gain knowledge related to human nutrition. Additionally, the nutrition community effectively translates nutrition knowledge for use by policy makers.

Medium Term

The number of nutrition educators, practitioners and researchers in the field is increased. These individuals effectively use educational tools and research and assessment outcomes along with restructured, applicable policy documents to develop appropriate nutrition and health related interventions.

Long Term

As a result of improved educational activities and opportunities, there will be increases in the number of effective nutrition education and interventions on diet quality, physical activity, and food safety at the community level. Also, the successful communication of pertinent research findings by highly trained scientists as well as the development of appropriate policy on food, and nutrition to include household and community food security and guidance on sustainable food systems will result in long-term improvements in health of Americans.

SUCCESS STORIES

A CRIS search identified SERD grants for the years 2003-2004. No SERD projects are found in CRIS prior to 2003 because CRIS data on SERD funding were not available prior to 2003. The following success stories are based on the most recent CRIS information and provide a snapshot of what is being done by CSREES partners through SERD funding to address the higher education needs related to human nutrition. These success stories show educational activities being offered in secondary schools associated with community colleges to stimulate awareness, knowledge and enthusiasm for nutrition in students at an impressionable age as well as those activities provided by college and university to students enrolled in undergraduate and graduate programs.

In each case the project purpose is stated, short, medium and long term goals provided and an impact statement included.

Secondary and High School Programs:

1) **Student Recruitment and Partnerships for Learning North Dakota State University, the Fort Berthold Extension**

The primary purpose of this grant is the recruitment and retention of students for agriculture science programs at Fort Berthold Community College (FBCC), a 1994 Land Grant Institution. They are focusing on informing junior high, high school students and other area residents of the employment possibilities and degree programs in the agriculture science field. Students must be recruited and retained in order to develop a viable and diversified professional work force nationally and locally. Partnerships, with collaborated efforts are established with North Dakota State University, the Fort Berthold Extension, the traditional elder gardeners, the Three Affiliated Tribes and essential community leaders within each segment.

- a) **Short-term outcomes:** A curriculum offerings, 100 hundred gardens completed using traditional and healthy food products, and foods distributed to about 200 elders on the Fort Berthold Reservation. These endeavors will have a positive effect on the health and nutrition of the people on the Fort Berthold Reservation.
- b) **Medium-term outcomes:** Recruitment is now off the ground and contact has been made with students in the different high schools. This should have a positive effect in the future enrollment. Garden preparation and garden workshops continue for members of the Fort Berthold Reservation.
- c) **Long-term outcomes:** Enrollment and retention in the agriculture science curriculum will be increased through recruitment on and off the reservation. Garden preparation and workshops will continue to improve the health and nutrition of the Fort Berthold Reservation.
- d) **Impact:** By completing this grant, the foundation for recruitment and retention of agricultural science and natural resource science students will be established. Tribal members will have improved health by eating home-grown garden produce and will be educated on a healthier lifestyle. This grant funding is needed to continue to educate and improve the life of tribal members. (No data at this time)

Higher Education Learning Programs:

1) **Multicultural Scholars into Dietetics Program, University of North Dakota Grand Forks, ND**

Situation

The purpose of the Multicultural Scholars into Dietetics Program (MSDP) is to increase the number of qualified American Indian nutrition professionals. The MSDP provides scholarships, tuition waivers, intensive mentoring, job shadowing and supervised practice experiences to capable Native students interested in becoming dietitians and nutritionists. Nutrition professionals who understand and can work with American Indians are desperately needed to effect dietary change to reduce the incidence of diabetes, hypertension, cardiovascular diseases, etc. among this minority population. Faculty in the Department of Nutrition and Dietetics at the University of North Dakota are implementing the MSDP. In addition, an extensive array of University support services particularly those who work closely with Native American students on the campus have close involvement in the success of the MSDP. Area Indian Health Services dietitians are involved in the identification of students with superior academic ability who are interested in nutrition.

- a) **Short term outcomes:** The MSDP faculty has learned that recruitment of prospective MSDP scholars is complex. These students have complex needs, financially, socially, and culturally, that all have to be addressed to be effective in a learning situation. Since retention of scholars is at least as difficult as

recruitment, close involvement of others invested in recruitment and retention of minority students is essential to success.

- b) **Medium term outcomes:** A plan has developed to involve local practitioners in such programs as the MSDP to encourage Native students to major in the nutrition department. Students need 5 years to graduate. Two scholars have selected and are in their third year of the MSDP; one student is a senior majoring in dietetics; the other is a five year student completing the sophomore year curriculum and should be ready to apply for the professional phase of the dietetics program in spring, 2006.

The Inclusion of dietetic majors in an interdisciplinary, cultural sensitivity summer experience allows allied health majors the experience to live for a month in the summer at one Indian reservation. This provides the opportunity for students to explore their understanding of Native culture, the need for health professionals on reservations and the advantages to work in an interdisciplinary manner. To date, four dietetics students (non-Native) have participated.

- c) **Long term outcomes:** As students funded through the 2002-04 USDA cycle are still students, long term results are not yet seen. It is anticipated that if the MSDP continues to be funded by the USDA, that the number of Native American dietitians and nutritionists serving the Native population will increase.
- d) **Impact:** Currently, students are in various phases in their curriculum, but have not yet graduated from the MSDP. Upon graduation and placement into the community it is expected by MSDP officials that MSDP graduates will have the potential to impact their community positively in a number of ways as role models for the next generation in terms of completing their education and pursuing college education. Also, culturally sensitive nutritional professionals who invest in the improvement of this minority population have the potential to significantly impact nutrition issues including: reduction in obesity rates of children and adults, reduced incidences of chronic illnesses particularly diabetes, hypertension and cardiovascular diseases.

2) **National Multidisciplinary Food Science Summer Research Program, Cornell University, Ithaca, NY 14853**

Situation

Traditional classroom-based teaching strategies often fall short of providing students with experience in areas such as critical thinking, teamwork, and exposure to ethical decision making. Furthermore, many food science undergraduate students receive their Bachelor of Science degree without actually exploring the role of research in food science. Consequently, undergraduate students may not discover their own underlying interest in pursuing a career in basic and applied food science research. The Cornell University Food Science Summer Scholars Program (CU FSSSP) was developed as an intensive 10-week summer program, with the goal of providing undergraduate students with an interest in food science an opportunity to gain research experience and develop their research ability, critical thinking, team work, and leadership skills. A particular focus of the program is on recruitment of students representing traditionally underrepresented minorities into the field of food science. A total of 84 undergraduates (including 16 students representing traditionally underrepresented minorities) have participated in the first six summer programs offered; participants represented 38 different universities, including 32 US universities. (see related news clips and stories)

- a) **Short-term outcomes:** There is a need for a program that exposes undergraduate students to research in food science and provides leadership training. Participants completed formal program evaluations, which showed they were highly satisfied with their laboratory experience (4.49/5; range 3.84 – 4.90)

and the overall program (4.55/5; range 4.36 – 4.82). Most students would recommend the program to friends and other students (4.71/5; range 4.44 – 4.88).

- b) **Medium-term outcomes:** Results from student evaluations have been used to improve specific program activities. In order to offer highly qualified applicants the opportunity to participate in this program, enhanced fundraising efforts have been created; so far fundraising from food industry has been highly successful, allowing for more than twice the number of positions covered by the USDA Higher education grant funding. In addition, efforts have been enhanced to recruit students representing traditionally underrepresented minorities in this program, e.g., through strategic alliances with minority serving institutions.
- c) **Long-term outcomes:** To assess the impact of the program, participants' career progression has been tracked. While many participants have not yet completed their BS degrees, 28 out of the 84 scholars have applied to or are attending graduate programs in food science and other supporting biological sciences (e.g., microbiology). A total of eight participants have entered careers in food related industries. These participants have the potential to make a difference in the food industry as it responds to the nutritional needs and food supply of underrepresented and perhaps underserved minorities.
- d) **Impact:** This program trains qualified professionals in food science, for future leadership positions in the food industry, government, and academia. They have the potential to make nutritionally creative and healthy changes to the food supply in terms of traditional food choices; thereby positively impacting on the health and well being of underrepresented minorities as well as the general U.S. population.

3) **Strengthening Scientific Preparation for Students in the Human Sciences: A Cooperative Program, Alabama A & M, Huntsville, AL**

The purpose of this project is to increase the pool of qualified and diverse students for graduate study and for professional positions in the field of human sciences. This will be accomplished via a number of activities targeted to strengthen scientific preparation for students and enhance faculty expertise and increase research opportunity in the human sciences. These activities include informing students about opportunities for research and graduate education through graduate preview sessions; providing research internships for a select number of students; providing opportunities for students to disseminate research; enhancing faculty research; and strengthening the relationship between FSU and cooperating historically Black colleges and universities. Participating universities in this project included a comprehensive research institution, Florida State University, and three historically Black universities: Alcorn State University, Fort Valley State University, and South Carolina State University.

- a) **Short-term outcome:** Lessons learned: Preparation of students, choice of experiences and timing were important in relation to the success of research internships. Experiences need to be tailored to the students and their level of awareness regarding research. Strengthening interactions among faculty mentors and research interns improves the quality of the students' work and the overall project. Finding people for the SciencPrep Project team (J Family Consumer Science, 96 (3); 16-23, 2004) who are committed to student development and institutional collaboration is essential to the success of the project. Financial resources need to be clearly communicated to partner institutions.
- b) **Medium-term outcome:** Action: Model developed by SciencPrep ProjectTeam, including inputs, transformational process and outcomes. Between 2000 and 2002, fifteen students completed ShowCase, the graduate preview component; seven students applied for research internship (46%); four students

completed (80%) research internship; four students were admitted or were in the process of being admitted to graduate school.

- c) **Long-term outcome:** Change in conditions: This study will identify models of scientific education that can help to prepare undergraduates, and to develop a stronger pool of diverse students for graduate programs in the field.
- d) **Impact:** Between this project and a similar one funded by another organization, well-prepared graduate students have now entered careers in nutrition and dietetics. Two of these students have secured the Registered Dietitian credential, two have obtained master's degrees, and a third earned a Ph.D. In 2003-04, SciencPrep continued without external funding. The SciencPrep Team continued to meet via conference call and secured funding from a third party (National Science Foundation summer stipend grant held by a faculty member at one of the cooperating institutions) to send a student to Florida State for the 2004 summer internship. SciencPrep II, under the direction of South Carolina State University, was funded by the Capacity Building Grants Program of USDA in 2004 and has expanded the project to include two additional historically Black institutions (Alabama A&M University and Southern University), and an additional research institution (Iowa State University). (see newspaper article, Capital Outlook, July 15-21, 2004; Focus, 2(1) 2002)

Publications related to this project:

Ralston, P., et al. (2002, June). The SciencPrep Project: A cooperative effort to provide undergraduate research experiences. Paper presented at the annual meeting of the American Association of Family and Consumer Sciences, Dallas, TX.

Fields, E., et al. ((2003, June). Successful outcomes of the SciencPrep Project: A cooperative effort to provide undergraduate research experiences. Paper presented at the annual meeting Scholarly outcomes include: Refereed Papers and Presentation:

Ralston, P., et al. (2004). The SciencPrep Project: Strengthening Scientific Preparation of Diverse Undergraduates. *Journal of Family and Consumer Sciences*, 96(3), 16-22.

Floyd, K., et al. Perceptions and experiences of historically Black colleges and university students for graduate school and professional roles. Paper in preparation

4) **Recruitment and Retention of Disadvantaged Students in a Nutrition/Dietetics Program Universidad del Turabo School of Health Sciences Nutrition and Dietetics Program, Gurabo, Puerto Rico**

This high school program developed and implemented pre-entry and retention activities for Hispanic individuals from disadvantaged backgrounds. It brings students to the nutrition/dietetics profession and will provide the skills to overcome obstacles for obtaining a college education. Participants will return to their communities to reduce the present nutrition/dietetics shortage and positively impact the health of underserved communities in Puerto Rico. An Advisory Board composed by distinguished representatives of different Puerto Rican community sectors is actively involved in this project. Also support has been secured from Juncos, Caguas and Gurabo High Schools administrative personnel. (See evidentiary materials for program flyers listings).

- a) **Short-term outcomes:** The participants have obtained information about nutrition and sciences, contemporary topics and information related to the use of research in the nutrition field.
- b) **Medium-term outcomes:** The project activities helped students to improve skills in mathematics, reading, language, writing and English language.
- c) **Long-term outcomes:** The activities helped students to develop and/or improve their test taking, time management and critical thinking skills as well as communicate effectively, work as a team, and identify, express and solve problems through the nutrition-dietetics curriculum and in their professional career.
- d) **Impact:** These students will return to their communities as educated professionals to reduce the present nutrition/dietetics shortage and positively impact the health of underserved communities in Puerto Rico.

NEW DIRECTIONS

To adequately address the ever-increasing need for higher education programs that can produce nutrition educators and researchers capable of working across disciplines related to diet and health, a multi disciplinary approach to curriculum development and program direction is warranted. Concurrently, a series of steps need to be taken by secondary schools to work effectively with local community colleges and universities to bring human nutrition and nutritional sciences into the classroom early in a student's education. This will increase awareness of nutrition, help establish a framework for nutrition as part of a healthy lifestyle, and has the potential to increase enrollment in human nutrition, nutritional science and food and technology programs.

Along with the substantive material and information provided through higher education in the classroom, the method of delivery and range of dissemination of this information is critical to accessibility and learning. On-line courses and distance learning are now vital components of higher education and nutrition subjects are conducive to this type of learning method and should continue to be used effectively as part of the multi disciplinary approach to nutrition education. Currently, a SERD funded project is underway to use interactive, computer-assisted-instruction (CAI) in undergraduate dietetic studies. It is expected that by using this type of instruction will benefit both students and faculty. Students will learn to effectively motivate clients and consumers to make healthy food choices, while faculty will be able to include more interactivity in course programming and student testing; thereby, providing rapid feedback and suggestions for improvement in course work. Because it will be Internet-based, the module can be used by educational institutions throughout the United States. It could be utilized in courses as an interactive teaching tool available in a computer laboratory or as an out-of-class assignment. With almost 300 certified dietetic programs in the United States, the module has the potential for reaching a large percentage of the students who will become the next generation of dietetic professionals.

As previously stated, CSREES in cooperation with public institutions, private sector partners, and the Land-Grant University System encourages higher education in human nutrition disciplines that recognize current public health concerns and supports a multi-disciplinary approach towards enhancing nutrition researcher and education curricula and programs. New directions in this regard should include curriculum enhancement and the creation of multi-purpose foods laboratory in support of nutrition and dietetics programs; agric-business opportunities at home and on an international level; Ph.D. training programs in support of food safety and bio-security; career development of minority and underserved graduate students through multi-institutional collaboration; curriculum development to include the psychological, behavioral and economic aspects of food; the integration of diet with physical activity research and evaluation to advance healthy lifestyles; and on-line and distance training opportunities as part of outreach education efforts. These new directions strengthen and

support the higher education and research framework of human nutrition and related disciplines; strengthen the field devoted to addressing nutrition education and behavior issues, promote the advancement of minority graduate students and offer the opportunity for multi disciplinary education.

STAKEHOLDER ASSESSMENT

To strive for excellence in academic, research, extension, and international programs in the food and agricultural sciences and realize new directions, SERD works closely with stakeholders interested in improving higher education programs in the food and agricultural sciences. In particular, input is sought from key stakeholders representing the minority and underserved student or potential student through community coalitions and public and private organizations. Also, stakeholder input is required to best understand international interests and used to leverage the research, education, and cooperative extension expertise of U.S. universities to a broad range of international programs and projects.

Both formal and informal procedures are used to obtain stakeholder input. These may include stakeholder workshops, symposia, technical reviews, peer panel recommendations, presidential directives, interagency agreements, and strategic plans for education programs. Additionally, CSREES and its educational partners conduct stakeholder listening sessions in order to assess program effectiveness and directions and to identify new and emerging issues. Stakeholder input is reviewed and analyzed and results serve as a guide to SERD program direction and activity.

EVIDENTIARY MATERIALS

U.S. Department of Education, National Center for Education Statistics; 2002; FAEIS (Food and Agricultural Education Information System) Database; personal communication with Dr. Ella Smith at USDA-CSREES-SERD; (see self study Appendix for raw data).

Congressional Commission on Advancement of Women and Minorities in Science, Engineering and Technology Development. Land of Plenty Diversity as America's Competitive Edge in Science, Engineering and Technology. Report, September, 2000.

National Science Foundation, Division of Science Resources Statistics, Science and Engineering Degrees by Race/Ethnicity of Recipients: 1992-2001, NSF 04-318, Project Officers, Susan T. Hill and Jean M. Johnson, Arlington, VA 2004. <http://www.nsf.gov/statistics/nsf04318>. Accessed November 3, 2005.

Frederick D. Patterson Research Institute Analysis of Department of Education Integrated Postsecondary Education Data System (IPEDS), 2004. Personal communication with Dr. Tazewell Hurst III; (703) 205-2001 (Phone); Tazewell.HurstIII@fdpri.patterson-uncf.org.

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Ralston, P., et al. (2002, June). The SciencPrep Project: A cooperative effort to provide undergraduate research experiences. Paper presented at the annual meeting of the American Association of Family and Consumer Sciences, Dallas, TX.

Fields, E., et al. ((2003, June). Successful outcomes of the SciencPrep Project: A cooperative effort to provide undergraduate research experiences. Paper presented at the annual meeting Scholarly outcomes include: Refereed Papers and Presentation:

Ralston, P., et al. (2004). The SciencPrep Project: Strengthening Scientific Preparation of Diverse Undergraduates. *Journal of Family and Consumer Sciences*, 96(3), 16-22.

Capital Outlook, July 15-21, 2004; Focus, 2(1), 2002. (Newspaper article)

Universidad del Turabo. Escuela de Ciencias de la Salud. Programa en Nutricion y Dietetica . Programa de Enriquecimiento Academico Sabatinio. (Program flyer)

Universidad del Turabo. Escuela de Ciencias de la Salud. Programa en Nutricion y Dietetica . Reclutamiento y Retencion de Estudiantes del Programa de Nutricion y Dietetics. (Program flyer)

B - SMALL BUSINESS INNOVATION RESEARCH PROGRAM (SBIR)

The USDA Small Business Innovation Research (SBIR) program, administered by CSREES, funds research and development and educational support programs for small businesses on a broad range of issues, ideas, or products including those related to food science and nutrition. Grants are awarded to qualified small businesses to support high quality, advanced concepts research related to important scientific problems and opportunities in agriculture that could lead to significant public benefit if successful. It does *not* provide businesses with money for operating or start-up costs. In addition to funding for food science and nutrition, SBIR funds are allocated over ten other broad topic areas including the environment and natural resources (animals, wildlife, aquaculture, plants, and forests), markets and trade, technology, industrial applications, and rural and community development.

SBIR grants are awarded on the basis of the scientific and technical merit of investigator initiated ideas. Proposals are reviewed through a confidential peer review process using outside experts from nonprofit organizations. SBIR Phase I grants are limited to \$80,000 and a duration of 8 months. Phase II grants are limited to \$300,000 and a duration of 24 months. Funding by USDA SBIR program from 2000 - 2004 to all topic areas and to Food Science and Nutrition for Phase I and II are provided in Table 14 below.

Table 14: USDA SBIR Funding to All Topic Areas and to Food Science and Nutrition – 2000 – 2004

Year	Total to All Topics	Funding to Food and Nutrition		Total Grants Awarded – All Topics	Number of Grants to Food and Nutrition	
		Phase 1	Phase 2		Phase 1	Phase 2
2000	\$14,956,377	\$803,912	\$1,050,000	127	12	4
2001	\$15,554,899	\$561,237	\$791,407	128	9	3
2002	\$17,167,406	\$671,026	\$1,420,380	124	9	6
2003	\$17,472,423	\$821,775	\$1,184,000	126	11	4
2004	\$18,696,223	\$893,213	\$2,051,179	137	12	7
Totals	\$83,847,328	\$3,751,163	\$6,496,966	642	53	24
% of Total	-	4.5%	7.7%	-	8.3%	3.7%

OUTPUTS

Research

USDA's SBIR awarded a total of over \$83 million in research and development projects between 2000 and 2004. This allowed many small businesses to explore their technological potential and provide an incentive to profit from the commercialization of innovative ideas. The SBIR made an important contribution to businesses involved in food science and nutrition projects. Of the total \$83 million, over \$10 million, or 12%, went to food science and nutrition. Over the 5 year time period 642 grants were awarded with 77, or 12%, going to food science and nutrition.

Extension

The products of SBIR grants may be intended for extension/outreach use. For example, the products of research and development may be educational tools intended for use in informal educational settings to teach children and adults about food science and nutrition.

Education

Because university involvement in SBIR projects is strongly encouraged, faculty can serve as consultants on food science and nutrition projects, they can receive a subcontract or serve as a PI if they reduce employment at the university to 49% for the duration of the grant and if the SBIR research is performed someplace other than their own research lab. The involvement of faculty provides an opportunity for the direct involvement of students in the projects and for faculty to bring their experience to the classroom in order to enrich the educational experience of their students with real life examples. In addition, the products of the SBIR grants may be intended for classroom use.

Integrated Programs

SBIR projects in food science and nutrition are integrated to the extent that the research results lead to products used in formal classroom education or informal extension/outreach programs.

OUTCOMES

Short Term

SBIR grants in food science and nutrition allow small businesses to learn their technological potential and to envision potential profit from the commercialization of their innovative ideas.

Medium Term

Having learned their technological potential, small businesses in food science and nutrition are in a position to:

- 1) Stimulate technological innovations in the private sector
- 2) Strengthen the role of small businesses in meeting Federal research and development needs
- 3) Increase private sector commercialization of innovations derived from USDA-supported research and development efforts
- 4) Foster and encourage participation by women-owned and socially and economically disadvantaged small business firms in technological innovations.

Long Term

Through the SBIR program, the expansion of small businesses leads to improvements in the national economy. SBIR projects in food science can lead to improvements in the quality of the US food supply. SBIR projects in nutrition can lead to improvements in the assessment of nutritional status and to the development of innovative environmental and educational interventions that improve the nutrition and health of Americans.

SPECIFIC EXAMPLES (See evidentiary material for CRIS reports of SBIR examples.)

- 1) Having established feasibility in Phase I, Valdez and Associates received a Phase II grant in 2001 to develop and evaluate a CD-ROM for teachers that is an easy to use and effective resource for integrating nutrition education content into classroom curricula in math, science, social studies, and language arts. Two peer-reviewed papers were presented at nutrition education conferences on this CD-ROM. A new SBIR grant was awarded to Valdez and Associates in 2004 to assess the feasibility of developing a CD-ROM to

teach paraprofessionals basic nutrition education concepts that they need in their extension/outreach work with low-income consumers.

- a) **Short term outcomes:** A nutrition education CD-ROM integrated into classroom curricula in math, science, social studies, and language, will enhance student knowledge about nutrition and nutrition careers is increased. As a result of testing the feasibility of developing a CD-ROM to teach paraprofessionals basic nutrition education concepts, the resultant product should increase the knowledge of paraprofessionals.
 - b) **Medium term outcomes:** Students will develop an interest in careers in food science and nutrition. The low-income target audiences of paraprofessionals will improve their diets.
 - c) **Long term Outcomes:** The nutritional status and health of students and low-income audiences affected by these SBIR projects may improve. Educational training resources developed and tested by this project may impact diet related diseases and the costs of health care and lost productivity of food assistance program participants.
- 2) In 2002, Craft Technologies, Inc, received a Phase II grant to develop a rapid field-test to measure vitamin A in four types of fortified foods (sugar, rice, flour, and dairy products) based on the use a modified portable fluorometer. Vitamin A (retinol and its esters such as retinyl palmitate) is an essential nutrient for human health. Vitamin A deficiency is, unfortunately, still a major human nutrition problem in many parts of the world. Vitamin A deficiency can be remedied by food fortification. To assure appropriate levels of fortification, it is necessary to measure vitamin A levels in fortified foods and in human serum (as one means to assess human nutritional status). The most common method of measuring Vitamin A in food and serum involves High Pressure Liquid Chromatography (HPLC). This method requires expensive equipment and skilled technicians. The SBIR grant to Craft Technologies, Inc resulted in development of a rugged, reliable portable fluorometer for analysis of vitamin A. This instrument has performed satisfactorily in the laboratory and in field testing. Simplified (“field-friendly”) methods have been tested for extraction and analysis of vitamin A (retinyl palmitate) from several commercial fortified food products.
- a) **Short term outcomes:** Knowledge of vitamin A levels in foods and in human serum increased due to the use of rapid, easy detection methodology.
 - b) **Medium term outcomes:** Increased knowledge of vitamin A levels in foods and in human serum improves the ability to run an effective vitamin A fortification program in parts of the world where vitamin A deficiency is a problem.
 - c) **Long term outcomes:** The project has the potential to improve the health of the 240 million children world wide whose health is compromised in varying degrees due to the deficiency of vitamin A in their diets.

SUCCESS STORY

With the help of USDA-SBIR funding (USDA 00-33610-9445) Health Technomics Inc of Annandale, Virginia developed a tool to facilitate communication between health professionals and the public in promoting sensible choices of portion sizes when eating, whether at home, in a food court, a restaurant, or at the workplace. The tool, called Health Technomics’ Computer-based Portioning Anchors (HTCPA), is a multipurpose program that serves as a visual reference (anchor) for measurement of food amounts and capacity of food and beverage

containers. HTCPCPA is a suite of independent computer programs that respond to different professional needs, but all focus on portion size estimation. Portion Basics is the primary program for use in educational settings, or as a stand-alone visual aid in dietary assessment. It displays multiple sizes and forms of about 300 of the most commonly consumed foods and 100 commonly used food and beverage containers. Of the over 800 photographs, 15% are containers. Photos were taken under standardized settings to preserve original height/width/depth ratios, to minimize distortion and to permit actual size printing. For foods, weights and measures (in both English and Metric systems) can be displayed on demand. For containers, dimensions and volume capacity can be displayed. For some foods, there is also a picture of the Food Guide Pyramid serving size for comparison with market-based servings.

A second program, Portion Counts, is the clinical version for use in weight management, diet management in diabetes, or meal planning for heart healthy meals. Portion Counts allows the user to view the calories, carbohydrates, protein, fat, cholesterol and fiber content of each food displayed. It serves not only as a counseling tool but can also provide reinforcement when installed on the client's computer.

The third and most comprehensive program, called Portion Plus, has all the functions of Portion Basics and Portion Counts, plus additional functions for data collection, storage, and retrieval. Thus, beyond educational and clinical uses, the program can serve as a research tool. For further description see www.healthtechnomics.net. In developing the tool, Health Technomics Inc collaborated with The Catholic University, Washington, DC, Frances Stern Nutrition Center, Boston, MA, Tennessee State University, Nashville, TN, and the University of Maryland, College Park, MD. A list of publications and presentations is attached to the CRIS report for this project in the evidentiary material.

Short-term Outcomes: Knowledge of how to assess and communicate information about portion size will increase. Product testing has led to advancing knowledge of cognitive issues regarding food portion estimation and the findings will be extremely useful in continuing cognitive research in dietary assessment.

Medium-term Outcomes: Use of the tools will improve dietary assessment so researchers, educators and practitioners will have a better understanding of the current diet of an individual or a population and will be better able to communicate recommended changes in the portion sizes.

Long-term Outcomes: Consumers will improve their diets as a result of more accurate and understandable recommendations about the amounts of foods they should be eating.

NEW DIRECTIONS

It appears as if nutrition education is increasingly important in the funding recommendations made by the USDA SBIR Food Science and Nutrition peer review panels. For example, two out of five Phase II grants funded under the Food Science and Nutrition topic area in FY 2005 were in nutrition education. There was another Phase II grant funded in nutrition, i.e., 60% of the FY 2005 SBIR Phase II grants in Food Science and Nutrition topic area were in nutrition. The Phase I grants for these projects, funded in FY 2004, satisfied the necessary technical and commercial feasibility requirements for the Phase II applications to be selected for funding in FY 2005. In comparison, only 25% of the Phase II grants under Food Science and Nutrition funded in FY 2000 were in nutrition and none were in nutrition education. If the trend towards higher funding for nutrition reflects an increasing emphasis on obesity, health and related issues nationally, we can expect this trend to continue.

The USDA–SBIR program is collecting stakeholder input to help develop new priorities for the Food Science and Nutrition topic area for FY 2006 and beyond. Meetings with CSREES NPLs in Food Science and Nutrition and other USDA agencies are planned. In addition, USDA SBIR program participates in several regional and national SBIR meetings where NPLs have one-on-one meetings with potential project directors in food science and nutrition. The regional and national meetings also provide the opportunity for USDA SBIR NPLs to interact with their colleagues in other federal SBIR programs, including Project Managers at NSF where there are similar programs. Where appropriate, inputs received at these meetings are also integrated into the USDA SBIR Request for Application. New directions for the USDA SBIR program will enhance the potential to transfer technology developed from other USDA grants to real world uses and strengthen complementarities with similar programs funded by other federal agencies.

C. OBESITY PREVENTION

Obesity is cited as a crosscutting issue because almost all of CSREES' nutrition related research, education and extension programs address it in some way. It is also cited here to recognize the seriousness of the problem and the important part that CSREES and its university partners can play in seeking a solution. National objectives addressing the obesity epidemic were established by the Department of Health and Human Services (HHS), USDA, other Federal agencies, and professionals across the country and were published in 2000, in *Healthy People 2010* [URL: <http://www.healthypeople.gov/>]. The objectives related to obesity are:

- Increase the proportion of adults who are at a healthy weight to 60% from a baseline of 42% in 1988-94.
- Reduce the proportion of adults who are obese to 15% from the baseline of 23% in 1988-94.
- Reduce the proportion of children who are overweight or at risk of being overweight to 5% from a baseline of 11% in 1988-94.

Under USDA's Strategic Plan goal to "Improve the Nation's Nutrition and Health," specific objectives relate to obesity.. These objectives include "achieve reductions in overweight and obesity that are consistent with *Healthy People 2010*"; and "in partnership with HHS, take action to encourage a reduction in overweight and obesity such that the percentage of obese adults will be no greater than 20% and the percentage of overweight children and adolescents will be no greater than 8% by 2007" (<http://www.usda.gov/ocfo/usdasp/usdasp.htm>).

However, data from the National Health and Nutrition Examination Survey (NHANES) for 1999-2002 indicate that an estimated 65 percent of U.S. adults are overweight or obese and 16 percent of children and adolescents are overweight. (www.cdc.gov/nccdphp/dnpa/obesity/trend/index.htm). (SEE Section 3, for more data.) Clearly, the population is moving in the wrong direction.

OUTPUTS

Research

Research on the causes and prevention of obesity are carried out in the Nutrition Portfolio under objective 4.1 and 4.2. Work is supported through formula funds, competitive grants and special grants. Research focuses on the full spectrum of the food system from food production and consumption to nutrient utilization and biological function. In universities across the country, groundbreaking biological research is underway on genetic and metabolic factors influencing obesity, including protein, fat and carbohydrate balance, dietary calcium and milk intake, the hormone leptin and ghrelin, and conjugated linoleic acid. Attention in food science research is being given to new and genetically modified foods with special health benefits. Research leading to improvements in the quality of nutrient dense foods, decreases in costs, or increases in availability all can have a positive effect on nutrition and health. Cutting edge behavioral research is being done on the influence of breast-feeding, portion size, food security, self-image, self-efficacy, risky behavior, and early childhood experiences in the home and day care setting. Community research is focusing on food availability and accessibility, food purchasing patterns, marketplace influences, and community involvement. These programs both improve diet and fitness and strengthen local agriculture and community life. (See list of supported projects in obesity prevention at NIFA) <https://nifa.usda.gov/program/obesity-prevention-healthy-weight-programs>

Education

CSREES' program in Sciences and Education Resources Development (SERD) (<https://nifa.usda.gov/program/agriculture-and-food-research-initiative-afri>) broadly supports education in the agricultural sciences in land-grant universities and colleges. These programs which are crosscutting themselves

were covered earlier in Section II. It should be noted here that SERD programs are designed to strengthen university programs and areas of study that would most benefit from the support and lead the way into the future producing researchers and educators capable of addressing modern problems. Obesity is an example of the type of problem that these programs are intended to address. It is a multifaceted problem not likely to be quickly solved and will need a comprehensive, multidimensional solution.

Extension

Extension and community outreach programs are covered in detail in Chapter III under Objective 4.2. The programs include outreach parts of the integrated NRI program in nutrition, the Cooperative Extension System and its special focus on “Reversing Childhood Obesity Trends,” the Expanded Food and Nutrition Education Program (EFNEP), the Food Stamp Nutrition Education (FSNE) program, the Nutrition and Child Health programs, the Community Foods Competitive Grants Program and 4-H programs. All educational and environmental interventions that address healthy eating must address eating within the caloric limits that will prevent excessive weight gain. Now that obesity has become such a problem, Extension and outreach programs are focusing more and more on avoiding excess energy intake and engaging in regular physical activity.

Integrated Programs

As is to be discussed in Chapter III under Objective 4.2, integrated research, education and extension programs are the norm in nutrition education. This is especially true when the focus is on obesity. Understanding the biological, psychological, sociological and environmental factors that influence obesity by themselves is insufficient. They should be understood as a complex of interacting factors that need to be addressed when developing interventions that are effective in changing the behavior. Multistate Research Fund projects have led the way in supporting integrated research/extension projects. The Initiative for Future Food and Agricultural Systems (IFAFS), which was in place in 2000 and 2001, and Section 31.5 of the NRI “Human Nutrition and Obesity,” which began in 2003, put competitive funding behind the importance of the integrated approach.

OUTCOMES

Short Term

Research and integrated research and outreach programs will improve understanding of the biological, behavioral and environmental factors that influence obesity and of the components of interventions that are likely to be successful in changing behavior. Students will improve their understanding of complex problems like obesity.

Medium Term

Based on an understanding of the factors that influence obesity and the components of successful interventions, effective educational and environmental interventions are developed. Sensitive evaluation tools will be put into place to measure the success of interventions. Adequate numbers of well trained nutritionists will be available to conduct research, education and extension programs that make a difference.

Long Term

Consumers will develop healthy patterns of eating and physical activity. They will be able to maintain a healthy weight and the prevalence of obesity and obesity-related diseases will decline.

SPECIFIC EXAMPLES

- 1) In 2001, an NRI research grant was awarded to Patricia Crawford, University of California, Berkeley, for a study entitled “Dietary Patterning and Obesity Through Adolescence.” The award was for \$250,000 over two years. Collaborating institutions were Kaiser Permanents, New York University, University of Hawaii, Cincinnati Children’s Hospital, University of Minnesota, University of Iowa and the University of Arizona. The purpose of the study was to examine the relationships between dietary patterns and weight outcomes in girls in the ten year National Heart Lung and Blood Institute’s Growth and Health Study which is the largest longitudinal dietary data set of Black and White girls. This study is different from many other studies in that, rather than studying the intake of nutrients or specific foods, it looked at patterns of intake of whole foods and their relationships to eating behaviors. The results of the work were presented at the National Nutrient Databank Conference, 2003. (See evidentiary material.)
 - a) **Short Term Outcomes:** Analysis of food group consumption showed that intake of sweetened beverages was a predictor of increased body mass index in both Black and White adolescent girls.
 - b) **Medium Term Outcomes:** Results of the study will be used to develop effective obesity intervention strategies to reduce access to and consumption of sweetened drinks by teens in the middle and high school years. Further, findings from this study can be used to inform the current policy debate regarding efforts to restrict provision and advertising of sweetened drinks to children in schools.
 - c) **Long Term Outcomes:** Excess weight gain due to sweetened beverage consumption will be reduced in adolescents due to policy decisions that decrease access to sweetened beverages in schools and educational strategies that decrease consumption.
- 2) The Woodlands Wisdom Nutrition Project was awarded a \$2 million 4 year grant in 2001 as part of the Initiative for Future Food and Agricultural Systems (IFAFS) program. It is one of the few integrated projects that bring together the education and extension functions, as opposed to the research and extension functions. The impetus for the project was the high prevalence of diet related diseases, especially obesity and diabetes, among American Indian people. Six Tribal Colleges (College of Menominee Nation, Turtle Mountain Community College, Leech Lake Tribal College, Fond du Lac Tribal and Community College, Lac Courte Oreilles Ojibwe Community College, and White Earth Tribal and Community College) partnered with the University Minnesota. Their goals were to increase the number of Native American practitioners in Nutrition and Food Science, improve research on the relationship of traditional food use to health, increase community engagement with issues of diet and health, and create a mechanism for sharing resources and information.
 - a) **Short Term Outcomes:** Each Woodlands Wisdom Tribal College now has an approved and established Associate of Science (AS) degree program in Food and Nutrition Science. Across the institutions, over 25 students have enrolled in, are participating or have graduated from the degree programs in Food and Nutrition Science. Two Tribal Colleges have completed articulation agreements with accredited dietetics programs (Turtle Mountain with University of North Dakota and Fond du Lac with University of Minnesota). Each Woodlands Wisdom Tribal College has hosted multiple community forum/health fair outreach activities to increase community engagement with issues of diet and health. Based upon this project experience, Woodlands Wisdom Tribal Colleges have targeted local and regional food systems assessment as a community-based participatory research priority.
 - b) **Medium Term Outcomes:** A model has been developed for cross-cultural nutrition curricula interfacing indigenous and biomedical epistemologies that may be shared with other projects. Several Woodlands

Wisdom Tribal Colleges have begun a community-based agenda to define, assess and develop indigenous food and food systems assets within their communities. Increased capacity at Tribal Colleges has leveraged additional sponsored food and nutrition projects and funding. An example is the community gardening programs that integrate research-based health, nutrition and food production knowledge into traditional Native American food systems.

- c) **Long Term Outcomes:** Greater respect among nutrition science professionals for cultural knowledge of American Indian perspectives will facilitate greater success for American Indian students of nutrition. More American Indian food and nutrition professionals will be educated to serve and improve the health of their communities. Tribal Colleges will play a central role in advancing the indigenous knowledge that their communities produce.
- 3) In 2001, Rebecca Mullis of the University of Georgia was awarded an integrated research and extension grant for a project entitled “Bringing It Home: Creating Healthy Generations in Low Income African American Families.” The grant was for \$2,130,000 over four years. The project is being conducted by the University of Georgia (UGA) Department of Foods and Nutrition in collaboration with the UGA Cooperative Extension Service and the Atlanta Public School System. The intent of the project is to provide a culturally-appropriate dietary intervention for low income African American children and their families who are at high risk for chronic disease and obesity. The objectives are to: 1) provide children with engaging physical activities; 2) provide school-to-home education materials that will build family-to-family relationships; 3) encourage children to talk with their parents about healthy food choices and physical activity; 4) evaluate the programs impact by measuring parent and child attitudes toward the program and their reported changes in food selection and physical activity. (See evidentiary material for publications.)
 - a) **Short-term Outcomes:** The school-based nutrition and physical activity intervention was well received by faculty and students. Students were engaged by the classroom and take home activities and expressed their appreciation of the program. Students reported behavioral changes and healthy weight loss resulting from their participation. The project established excellent rapport between UGA researchers and the Atlanta Public School System. This relationship has allowed entry into the school system for subsequent nutrition and physical activity research projects.
 - b) **Medium-term Outcomes:** The data are expected to indicate that parents and children increase their consumption of fruits, vegetables, and low-fat foods, decrease their consumption of high-fat and high-sugar foods, and increase their physical activity. Copies of the curriculum and program videos are being distributed to all participating schools to support and sustain health promotion efforts conducted by the schools.
 - c) **Long-term Outcomes:** It is expected that parents and children will have decreased risks of developing obesity and chronic diseases. It is expected that the school environment will continue to value and promote healthy nutrition and physical activity behaviors among present and future students.
 - 4) A research project entitled “Obese Female Restrained Eaters: Two Treatment Options” was led by Judith Stern, University of California, Berkeley. The project was supported through Hatch formula funds for 1999-2005. The specific aim was to see if one could improve the psychological health and well-being of obese female restrained eaters using a non-restrictive (“non-diet”) approach. This non-diet approach emphasized eating in response to physiological cues (using hunger and satiety as regulators of food intake) and enhancing body acceptance. The non-diet approach was compared to the standard behavioral obesity treatment program (control group) which emphasized reducing energy intake and weight loss. Both treatments encourage improving dietary quality and increasing physical activity. The hypothesis was that

the non-diet approach would have an overall better long-term result because of improved self-esteem, decreased depression, improved body image and other general psychological characteristics. The project was collaboration between researchers at the University of California, Davis and researchers at the USDA Western Human Nutrition Research Center which is part of USDA's Agricultural Research Service. The results of the study will be disseminated through publications in peer reviewed journals and presentations at scientific meetings. (See evidentiary material)

- a) **Short-term Outcomes:** Attrition was high in the Diet Group (41%), compared to 8% in the Non-Diet Group. The Diet Group showed initial improvement in many variables, including weight, low-density lipoprotein, systolic blood pressure, energy expenditure, hunger, disinhibition, bulimia, body dissatisfaction, interoceptive awareness (markers for eating disorders), depression and self-esteem, although only the improvement in disinhibition was sustained at two year follow-up. The Non-Diet Group, on the other hand, improved in all of the above variables except weight, which exhibited no change, and sustained these improvements at two years. Fifty percent of both groups returned for two year evaluation. The Diet Group lost weight and showed initial improvement in many variables at one year. However, weight was regained and little improvement was sustained. The Non-Diet Group maintained weight, improved in all outcome variables, and sustained improvements.
- b) **Medium-term Outcomes:** Further work will be done to assess the effectiveness of the non-diet approach and its application to other audiences.
- c) **Long-term Outcomes:** If successful, the non-diet approach will offer a new way of preventing and treating obesity.

SUCCESS STORY

In 2000, a \$4 million grant was awarded for WIN the Rockies (Wellness IN the Rockies), a four-year behavior-change consortium project. It involved the University of Idaho, Montana State University, the University of Wyoming, their extension services, their WWAMI (Wyoming, Washington, Montana and Idaho) Medical Education Programs, the Area Health Education Centers in Wyoming and Montana, along with other state organizations and community groups. The purpose of the project was to enhance the well-being of individuals by improving their attitudes and behaviors related to food, physical activity, and body-image; and help build community capacity to foster and sustain these changes. The ultimate goal was to stem the rising tide of obesity. Faculty and staff associated with the Cooperative Extension System and medical education at the states' Land Grant Universities interacted with individuals and community groups in two rural communities in each state. The project combined qualitative and quantitative research, intervention, and outreach among youths and adults. Copies of educational materials, both lay and professional publications, and promotional materials are included in the evidentiary materials and on their website www.uwyo.edu/wintherockies.

Short-term Outcomes: The research team learned that most youths and adults had low levels of physical fitness, and some adults indicated that physical activity needed a productive purpose for them to participate. At the community level, they learned that lack of safe street crossings and inadequate access to walking paths were examples of barriers to activity. Factors associated with high body mass index included distracted eating, excess soft drink consumption, regular intake of "super size" portions and poor self-image. Qualitative research findings indicated that individual identities relative to both body image and physical abilities can be impacted substantially by other people, in both negative and positive ways. Analysis of project data is ongoing.

Medium-term Outcomes:

Community education programs targeted broad age categories and made use of multiple community interfaces. Walking programs proved to be easiest for communities to embrace. Hospitals, health care providers, and local businesses helped promote healthy lifestyles at health fairs and other local celebrations and festivals. An Extension-taught program has documented one or more sustained lifestyle changes in 100% of respondents at follow-ups at least one year later. Media campaigns utilized billboards, newspapers and radio to give community members feedback about their own efforts and to promote healthy lifestyle principles advocated by the project. School programs helped mobilize students to be educators within their own families. This cross-generational approach also was employed successfully in programs managed by local governments, such as parks and recreation programs. The project's seven major educational interventions are summarized on their website along with links available for downloading. Numerous presentations have been given including ones at the Society for Nutrition Education, American Dietetic Association and the American Association for the Advancement of Science. A book entitled *Let Their Voices Be Heard* which compiles approximately 2000 quotations about food and eating, physical activity, and body image drawn from interviews with community residents is to be published. In addition, numerous lay and professional publications have been produced (See evidentiary materials)

Long-term Outcomes:

The 27 mini-grants awarded in project communities funded local priorities, many of which (e.g., milk machines in 6 schools and other community settings, walking trails in 2 communities, etc.) will sustain long-term lifestyle improvements. Project researchers who returned to the cooperating communities have discovered numerous activities and programs have been continued by one or more community agencies beyond the funded project period. Local groups most likely to sustain the efforts include health care providers and hospitals, Cooperative Extension agencies, schools, and local governments. Beyond the project communities, direct training and the sharing of teaching and assessment tools with other educators, health-care providers, and researchers have equipped professionals in at least 30 states, Australia and Scotland, with tools to effectively promote and assess healthy lifestyle changes.

NEW DIRECTIONS

Obesity Prevention has become a focus for CSREES, its university partners, USDA and the Federal government. The NRI section "Human Nutrition and Obesity" is new, having begun in 2003. Three national meetings have been held to gather stakeholder input about the direction of this NRI program. Input has also been gathered from the annual grant review panels for this section. Within CSREES, a working group has been in place for over a year tasked with bringing together national program leaders who play a role on obesity prevention. CSREES is also represented on a new interagency committee on obesity which includes USDA, HHS, NSF and OSTP. Based on this input, CSREES will continue to focus on obesity prevention using all the resources available to it as described above. A goal for the future is to gain synergy by increasing coordination among the many entities that are working to address the problem of obesity.

Section III – Discussion of Knowledge Areas

PORTFOLIO 4.1- Improve Human Health by Better Understanding the Nutrient Requirements of Individuals and the Nutritional Value of Food

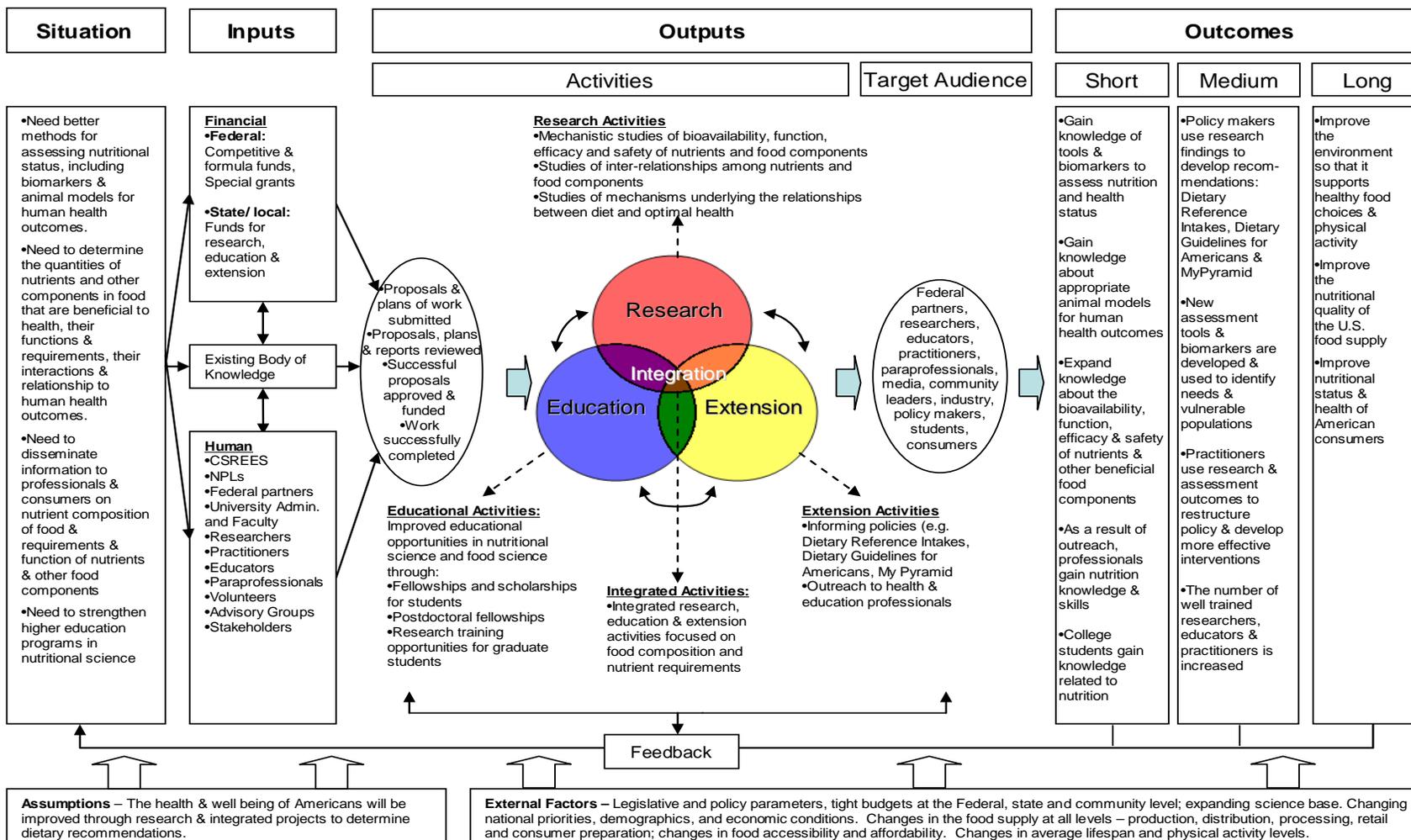
Knowledge Area 701: Nutrient Composition of Food; and Knowledge Area 702: Requirements and Function of Nutrients and Other Food Components

OVERVIEW

The following logic model shows how activities in Portfolio 4.1, covering Knowledge Area 701 – Nutrient composition of food and Knowledge Area 702 – Requirements and functions of nutrients and other food components are carried out and the expected outcomes.

Portfolio 4.1 – Improve Human Health by Better Understanding the Nutritional Requirements of Individuals and the Nutritional Value of Foods:

KA 701 Nutrient Composition of Food and 702 Requirements and Function of Nutrients and Other Food Components



The research, education, extension and integrated activities carried out under KA 701 expand the body of knowledge about the composition of food—the levels of nutrients and other bioactive food components that are in foods typically consumed by Americans. This information is needed before investigations concerning the function of these food components can take place. Therefore, the research, education, extension and integrated activities carried out under emphasis area 702 build upon the body of knowledge obtained from work under emphasis area 701. These activities expand the body of knowledge about the requirements and function of nutrients and other bioactive components in food—what components are needed and the amounts required for optimal health and how these components function in the body to promote health. Work from both emphasis areas provide the basis for assessments of the nutritional status of the population and nutrition interventions described in emphasis area 703, Nutrition Education. All of these components work together to support the Portfolio and CSREES’s goal to “Improve the Nation’s Nutrition and Health.”

The work carried out under Knowledge Areas 701 and 702 involves research, education, extension and integrated projects. Both emphasis areas are covered together in one section of the report, because they are typically combined in many of the projects that CSREES funds. It is necessary to obtain information about the levels of a nutrient or other component in food before designing studies to gain information about the functions of and requirements for these food components. In cases where such information is lacking in the research literature, the investigator must first do an analysis of the food item for the levels of the food component of interest (KA 701) before proceeding with research regarding the requirements or function of that component (KA 702). For example, a research project may be classified as having 20% of the work involved with food composition (KA701) and the remaining 80% involved with requirements and functions of nutrients and other food components (KA702). In the case of integrated projects, a typical project may be classified as 20% KA 701, 50% KA 702 and 30% KA 703 (nutrition education). Projects for which the work is captured primarily in KA 703 (nutrition education) are discussed in a separate section of this [report \(pg. x\)](#).

The goals of work carried out under KA 701 are to determine the quantities of nutrients and other components in food, develop methods for analyzing food composition, and develop and maintain data banks of information on food composition. Work to develop software and other systems to facilitate use of data on food composition, including recipe calculations, to develop and evaluate educational materials and strategies on food composition and to disseminate information on food composition for professionals, students, and the public also fit under this classification code. ARS bears the primary responsibility for conducting research in this knowledge area. CSREES funds research projects on determining quantities of nutrients and other bioactive components in food when this information is needed as background information for additional research on the bioavailability, function, or requirements of these components. CSREES also funds grants to purchase equipment used in subsequent research projects to analyze food composition. CSREES extension, education and integrated projects disseminate research findings to professionals, students and to consumers.

Work carried out under KA 702 concerns fundamental information about relationships of food eaten by people to their physical and mental development, physical activity and to the maintenance of optimal health. This area is concerned with defining nutrient requirements and their functions throughout the life span. Functions include cellular and molecular regulation of gene expression by specific nutrients or bioactive food components. This area is also concerned with the development of methods to quantify relationships of nutritional status to well-being to provide a scientific basis for establishing nutrition policies, such as Dietary Reference Intakes and Dietary Guidelines for Americans.

SITUATION

The consumption of a nutritious diet is important for maintaining long-term health and decreasing the risk for chronic disease. Poor diet and a sedentary lifestyle contribute to about 400,000 of the 2 million annual deaths in the United States (Mokdad, 2004). Much more research is needed on the requirements, function and interrelationships of nutrients and other bioactive food components. Where to focus scarce resources is a problem.

Better methods are needed for assessing the nutritional status of Americans. These methods include the use of biomarkers to assess disease risk and the development of appropriate animal models for studying human health outcomes.

Currently, the Dietary Reference Intakes published by the National Academy of Science's Institute of Medicine provide information about nutrient requirements by age and gender. However, limited information is available for some nutrients, and very little is known about requirements for bioactive compounds in foods that have not been classified as nutrients, e.g., soy phytoestrogens, conjugated linoleic acid. Even less is known about the mechanisms by which some nutrients and most other bioactive food components affect health outcomes and how they interact when consumed together in typical diet rather than in isolation. More research is needed to answer these questions.

Finally, the work is not complete unless it is disseminated to professionals in forms they can use in education and outreach efforts for consumers. Information on food composition and requirements and function of nutrients and other food components must also be used in educating students who will become the professionals responsible for conveying this information to consumers in the future.

ASSUMPTIONS

Work in Knowledge Area 702, *Requirements and Function of Nutrients and Other Food Components* will be a major contributor to the body of knowledge that is the basis of recommended nutrient intakes for age and sex groups in the United States. Information generated in Knowledge Area 701, *Nutrient Composition of Food* will provide information for professionals and consumers on food sources of nutrients. Together, information on nutrient requirements and food composition will form the basis of food guides which show the public how to translate scientific information into practical guides for eating. Work in Knowledge Area 703, *Nutrition Education and Behavior*, builds upon this improved knowledge base to develop interventions that will lead to improved health of Americans.

EXTERNAL FACTORS

In addition to the External factors mentioned on in Chapter II on the overall Nutrition Portfolio, there are several factors that are particularly important to Portfolio 4.1-

- New research findings are constantly expanding the science base of nutrition which may lead to changes in dietary guidance.
- The food supply is constantly changing with the introduction of many new foods and food products, often as the result of new research findings and market influences. This requires constant updating of food composition data bases.

- Weather, global trade, farm policy and the sustainability of local food supplies affect food affordability and accessibility.

INPUTS

Financial Inputs

Table 15 shows the sources of CSREES funding for Knowledge Area 701 Nutrient Composition of Food for FY 2000-2004. CSREES funding for KA 701 is relatively limited. The majority of work in this area is done by the Food Composition and Nutrient Data Laboratories of USDA's Agricultural Research Service (ARS). The bulk of CSREES funding for this area comes from Special Grants, followed by Hatch, Evans Allen, Other CSREES (primarily from the Initiative for Future Agriculture and Food Systems program or IFAFS), and the National Research Initiative Competitive Grants Program (NRICGP). Funding levels are small because most of the work on food composition is done as one component of a larger project that also encompasses KA 702, requirements and function of nutrients and other food components. A single project often spans both KAs because it is necessary to know the levels of a nutrient or beneficial component in food in order to design a study to determine requirements or mechanism of function of that nutrient or food component. Therefore, there is a great deal of variability in funding; in some years there are many projects that require food composition work and in other years there are no or few such projects.

Table 15: CSREES Funding for Nutrient Composition of Food (701), by Source, 2000-2004

Funding Source	Fiscal Year (<i>in thousands</i>)					Grand Total
	2000	2001	2002	2003	2004	
Hatch	\$ 510	\$ 573	\$ 615	\$ 641	\$ 481	\$ 2,820
Mc-Stn	\$ 0	\$ 0	\$ 0	\$ 3	\$ 4	\$ 7
Evans Allen	\$ 507	\$ 598	\$ 437	\$ 435	\$ 512	\$ 2,489
Animal Health	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Special Grants	\$ 96	\$ 447	\$ 1,424	\$ 1,436	\$ 385	\$ 3,788
NRICGP Grants	\$ 225	\$ 287	\$ 31	\$ 59	\$ 209	\$ 811
SBIR Grants	\$ 0	\$ 0	\$ 0	\$ 0	\$ 80	\$ 80
Other CSREES	\$ 120	\$ 416	\$ 0	\$ 176	\$ 307	\$ 1,019
Total CSREES	\$ 1,458	\$ 2,321	\$ 2,506	\$ 2,752	\$ 1,978	\$ 11,014

Table 16 shows the sources of funding for KA 702, Requirements and Function of Nutrients and Other Food Components. The majority of the funding in this area comes from NRICGP, followed by Hatch Formula Funds, Other CSREES grants (primarily from IFAFS) and Special Grants.

Table 16: CSREES Funding for Requirements and Functions of Nutrients and Other Food Components (702) by Source, 2000-2004

Funding Source	Fiscal Year (<i>in thousands</i>)					Grand
	2000	2001	2002	2003	2004	

						Total
Hatch	\$ 2,144	\$ 2,478	\$ 2,290	\$ 2,366	\$ 2,296	\$11,574
Mc-Stn	\$ 0	\$ 0	\$ 0	\$ 0	\$ 1	\$ 1
Evans Allen	\$ 511	\$ 636	\$ 456	\$ 991	\$ 1,013	\$ 3,607
Animal Health	\$ 20	\$ 23	\$ 0	\$ 1	\$ 9	\$ 53
Special Grants	\$ 1,069	\$ 744	\$ 1,323	\$ 1,438	\$ 2,651	\$ 7,225
NRICGP Grants	\$ 4,322	\$ 4,478	\$ 3,219	\$ 3,667	\$ 1,347	\$17,033
SBIR Grants	\$ 0	\$ 0	\$ 232	\$ 52	\$ 0	\$ 284
Other CSREES	\$ 5,693	\$ 6,252	\$ 276	\$ 0	\$ 0	\$12,221
Total CSREES	\$ 13,758	\$14,610	\$ 7,796	\$ 8,516	\$ 7,317	\$51,997

There is variability in funding from selected programs from year to year, shown in both Tables 15 and 16. For example, there is a large decrease in “Other CSREES” grants between 2001 and 2002. Grants from the IFAFS program are classified under this area. Because this program was offered only in 2000 and 2001, there is a large drop in this category in subsequent years.

The Animal Health and McIntire-Stennis programs do not normally fund nutrition projects. However, both programs funded specific projects that had small nutrition components (ranging from \$1,000 to \$23,000) in some years, as noted in Tables 15 and 16.

There was a large increase in projects under classification code 702 funded by Evans Allen funds in 2003 and 2004 (Table 16). The increase was due to a larger number of projects having components related to requirements and function of nutrients and other food components in those years. Most of the projects funded in those years are related to the development or study of functional foods, (foods that supply a health benefit beyond supplying basic nutrient requirements). The increase can be explained by increasing interest in research on functional foods in recent years.

The Small Business Innovation Research (SBIR) program also shows a large amount of variability in funding from year to year (Tables 15 and 16). SBIR is a competitive program that solicits investigator initiated research. The SBIR Food Science and Nutrition study section covers a broad range of topics in nutrition, food science, and food safety. Therefore, research topics that receive funding in any given year vary depending on what is submitted to the program that year. In some years, the program may not receive any proposals, or may not receive high quality proposals that address food composition or requirements and function of nutrients or other food components.

The NRICGP is also a competitive program which solicits investigator-initiated research. Funding for food composition (Table 15) varies depending on projects submitted in any given year. As noted previously, this funding is typically part of a larger project where the bulk of the funding is used for addressing requirements and functions of nutrients or other food components (KA 702). NRICGP funding for the latter area (Table 16) gradually decreased between 2000 and 2003, due to the reallocation of funds for other agency priority areas, including agricultural genomics and obesity related research. The decrease in 2004 is an artificial one. In FY 2004 the NRICGP Request for Applications was released later than usual, due to legal review necessitated by adding integrated programs with a different funding authority than other NRICGP programs to the RFA. That led to a delay in submission deadlines, review panels and awards. Many NRICGP awards made with FY 2004 funds were not completed until FY 2005 and therefore are not covered in this report. The small but gradual decline in NRICGP funds has led to the need to focus the program priorities more narrowly. This process began in FY 2005 and is discussed in “Future Directions” (pg. 23).

Existing Body of Knowledge

ARS develops and maintains the National Nutrient Database for Standard Reference (<http://www.ars.usda.gov/ba/bhnrc/ndl>). The database serves as the repository for existing knowledge about composition of foods found in the U.S. It is used in food policy, research and nutrition monitoring. Work supported by CSREES under KA 701 and 702 builds upon this database. In general, when CSREES supports research under KA 701, it is because the National Nutrient Database for Standard Reference does not contain adequate data on the nutrient or food component for the food item being studied. Therefore, work supported by CSREES under KA 701 expands the existing body of knowledge about food composition.

The Institute of Medicine (IOM) of the National Academy of Sciences, in cooperation with scientists from Canada, conducts systematic reviews by expert panels of existing knowledge concerning requirements and functions of nutrients. It also publishes a comprehensive set of reference values for nutrient intakes (Dietary Reference Intakes or DRI) for healthy U.S. and Canadian populations. A Federal Advisory Group, of which CSREES is a member, provides input for the DRI development process. Work supported by CSREES under KA 702 in the past has been used to develop the existing DRI.

Human Inputs

The CSREES nutrition staff consists of the nine nutritionists identified in the Executive Summary. Although the number of CSREES nutritionists is small, the network of Federal, university and community partners is large. At the Federal level, CSREES connects with work occurring inside USDA and within HHS through two Nutrition Coordinating Committees – one chaired by USDA and one chaired by HHS. CSREES nutrition staff stays connected with the IOM by membership on advisory committees and with professional societies, such as ASN, ADA, and SNE, through service as consultants on various committees. CSREES considers its association with its university partners most important. Connections are made through oversight and post award management of competitive grants and Hatch-funded projects. CSREES staff leads panels consisting of university faculty, as well as industry and Federal researchers, for the review of research proposals. CSREES also takes advantage of its ties with partners by seeking their input, especially on the direction of future work. Numerous list-serves and professional associations keep the partnerships connected.

OUTPUTS

Research

Between 2000 and 2004, CSREES funded a total of 722 projects that supported food composition research (KA 701) and 1835 projects that supported research on requirements and function of nutrients and other food components (KA 702). As shown in Tables 15 and 16, projects supported by the NRICGP “Improving Human Nutrition for Optimal Health” received the greatest amount of funds (almost \$18 million), followed by projects supported with Hatch formula funds (over \$14 million) and other CSREES grants, primarily from the IFAFS program (over \$13 million). Some of the Hatch formula funds were used to support five year Multistate Research Fund (MRF) projects carried out during 2000 – 2004. Projects funded by the IFAFS and MRF programs include integrated activities.

Projects carried out under these KAs include: 1) studies to determine the levels of nutrients in ethnic and other foods that have not been previously analyzed; 2) grants for the purchase of equipment to analyze food composition, particularly in foods of state and regional interest; 3) studies to determine the levels of bioactive components (e.g., conjugated linoleic acid, resveratrol, soy phytoestrogens) in food; 4) studies to determine nutrient requirements for specific populations for which requirements have not been well-defined, e.g., infants and older adults; 5) studies to ascertain the bioavailability, efficacy, safety, and function at the molecular level of non-nutrient bioactive food components; 6) studies of the effects of dietary nutrients and other bioactive

components on gene regulation; 7) studies of the interrelationships among dietary components; and 8) studies to determine the mechanisms underlying the relationship between diet and optimal health, e.g., influence of dietary components on the immune, cardiovascular, and central nervous systems.

Extension

The results of research and integrated projects are presented to research and extension/outreach professionals through journals and presentations at professional meetings directed towards them. Professional societies, at which research findings are disseminated to other researchers, educators, and extension professionals via oral presentations or posters, include the American Society for Nutritional Sciences (recently renamed the American Society for Nutrition), the Institute of Food Technologists, the Society for Nutrition Education and the American Dietetic Association. Proceedings from many of these conferences are later made available in scientific journals or on web sites so that the information can be disseminated beyond the original conference attendees. Additionally, the National Research Initiative Competitive Grants Program “Improving Human Nutrition for Optimal Health” provided partial support for a number of conferences, including:

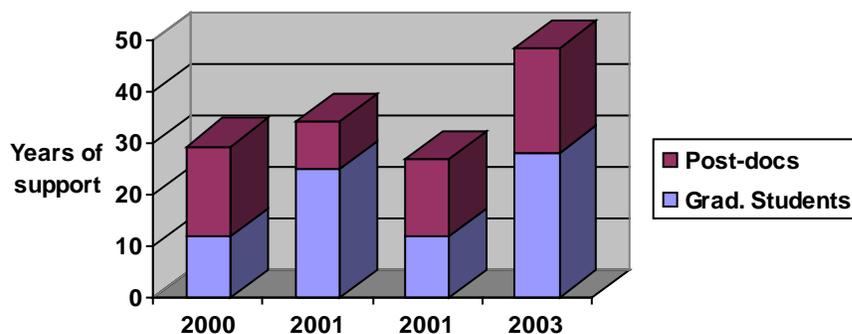
- The International Trace Elements Conference in 2003.
- A joint meeting of the 5th International Food Data Conference and the 27th National Nutrient Databank Conference in 2003 (see pg. x [13-14 in this manuscript] for additional information).
- Whole Grains and Health, a conference sponsored by the University of Minnesota in 2004.
- Vitamin E and Health, a conference sponsored by the New York Academy of Sciences in 2004.
- Diet Constituents and Molecular Regulation, a summer conference sponsored by the Federation of American Societies for Experimental Biology (FASEB) in 2004.
- Trace Element Metabolism, a FASEB summer conference in 2004.
- Retinoids, FASEB summer conferences in 2002 and 2004.
- Nutrient Control of Gene Expression and Signaling, a FASEB summer conference in 2005.
- Folate, Vitamin B12 and One-Carbon Metabolism, a FASEB summer conference in 2004.

Peer-reviewed journal articles and conference proceedings provide targeted audiences with easy access to research findings. Educators and practitioners use this information to develop educational materials about the composition of food, for example, materials on how to read food labels or about foods that are good sources of important nutrients. Public officials also use research findings as a basis for policy changes designed to improve the health of Americans (e.g. changes in food labeling requirements, Dietary Reference Intakes and Dietary Guidelines for Americans).

Education

Graduate and undergraduate education activities are covered in this report in the Higher Education Theme Area. However, it should be noted here that research projects supported by CSREES frequently include financial support for graduate students, postdoctoral researchers and sometimes for undergraduate students to work on research and integrated projects. Between 2000 and 2003, research projects funded by the National Research Initiative “Improving Human Nutrition for Optimal Health” program provided support for a total of 36 graduate students for a total of 77 person-years between 2000 and 2003 – an average of 2.1 years of support per student (see Figure 12). The program also supported 30 post-docs for a total of 62 years – an average of 2.1 years of support per post-doc. Note that data are not presented for 2004. Because of a delay in publication of the Request for Applications for the NRICGP in FY 2004, projects funded with FY 2004 funds were not awarded until FY 2005 and therefore are not captured by this report.

Figure 12: Support for Graduate Students and Postdoctoral Researchers provided by National Research Initiative Competitive Grants under Knowledge Area 702, Requirements and Function of Nutrients and Other Food Components, 2000-2003



Graduate students are also given the opportunity to present the results of their research at professional society meetings such as those listed above under “Extension.” Additionally, CSREES holds two USDA/CSREES Grantsmanship Workshops each year, one in Washington, DC and one in the Western Region. These workshops are open to anyone interested in learning more about CSREES competitive funding programs, effective grant writing and the grant review and approval process. Many National Program Leaders participate in additional workshops relating to their programs in conjunction with professional society meetings. Between 2000 and 2004 over 10 such workshops were conducted by CSREES nutrition staff. Research, extension, and integrated projects supported by CSREES have provided opportunities for teaching the next generation of researchers, educators, and practitioners by allowing for student and postdoctoral participation in research and integrated projects.

Integrated Programs

CSREES provides opportunities for projects to integrate research, education, and extension functions so that new knowledge resulting from the research is transmitted to students and consumers and there is opportunity for feedback from students and consumers which serves to guide the research process. Research in human nutrition is of interest to American consumers and, because of this interest, reports of nutrition research findings are frequently carried in the news media – television, radio, internet and print publications. Because of the direct application of nutrition research findings to extension and education, practitioners and educators need to work closely with researchers to ensure that the information consumers receive is accurate. Therefore, researchers, practitioners and educators tend to work in teams. The Multistate Research Fund (MRF) process provides a structure for multistate, long term projects and has long been a mechanism for drawing researchers, educators, practitioners and graduate students together. In recent years, the MRF approval process has required projects integrate research, education and extension functions. Three such projects include components that deal with food composition or requirements and function of nutrients and other food components. The Initiative for Future Agriculture and Food Systems (IFAFS) Competitive Grants Program, which was funded in 2000 and 2001, required projects to integrate research, education, and extension activities. Fifteen IFAFS projects include objectives relevant to nutrient composition of food and/or to requirements and function of nutrients and other food components

OUTCOMES

Short Term

The results of research, education, extension and integrated projects expand the knowledge base about the composition of food. Practitioners, educators and college students gain knowledge about the levels, requirements and functions of nutrients and other bioactive components in food. Consumers gain knowledge about what constitutes a healthful diet from information on food composition and nutrient requirements on food labels, publications, computer software, Web pages, and other media outlets.

Medium Term

Based on the short term outcomes, policy makers develop recommendations for the general public. The expanded knowledge base about nutrient composition of food and requirements and function of nutrients and other food components is included in courses offered to students in the areas of nutrition and food science. Practitioners use the expanded knowledge base to make recommendations to and publications for their target audiences. Researchers use the expanded knowledge base to develop new food products that are good sources of nutrients and other bioactive compounds.

Long Term

Food producers, processors and retailers adapt the new food products developed by researchers to make them available to consumers. The quality of the U.S. food supply is improved, and consumers are able to make more healthful food choices, leading to improvement in the health of Americans.

SPECIFIC EXAMPLES

The following success stories are based on information taken from CSREES's Current Research Information System (CRIS) and information provided to CSREES by Project Directors of funded projects. Between FY 2000 and FY 2004, CSREES funded over 110 projects through IFAFS and the NRICGP that included work in emphasis areas 701 and/or 702. These projects resulted in over 250 peer-reviewed journal articles and presentations for professional societies and provide an example of the work being done by CSREES partners in the areas of nutrient composition of food and requirements and function of nutrients and other components. In each case the project purpose is stated, short, medium and long term outcomes are provided and an impact statement included.

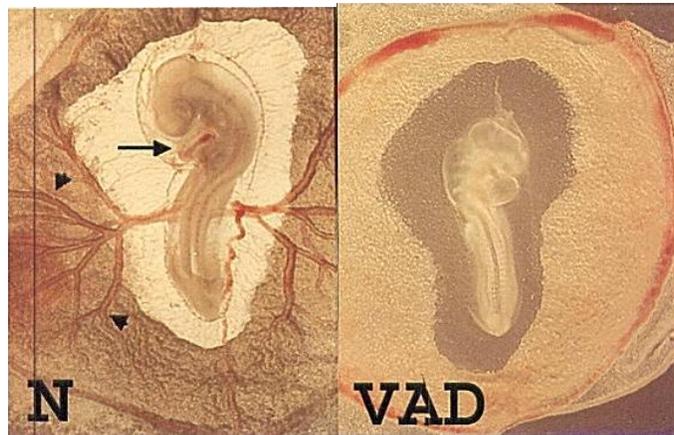
Examples and success stories are divided into two different categories: Basic Nutrient Requirements and Bioactive Food Components. Projects listed under Basic Nutrient Requirements are those where the primary focus is on "traditional" nutrients, e.g., those for which enough information is known to allow the IOM to set Dietary Reference Intakes. Projects listed under Bioactive Food Components are those where the primary focus is on constituents in foods, other than those needed to meet basic human nutritional needs, that are responsible for changes in health status.

Basic Nutrient Requirements

- 1) In FY 2000, a three-year NRICGP grant of \$180,000 was awarded to Michigan State University for a project entitled "Function of Vitamin A in Quail Embryogenesis. This project was a competitive renewal of work previously funded by the NRI. The objectives of the project were to clarify the requirement for vitamin A nutrition in development of the embryonic vascular system and to provide a framework for a molecular approach to vitamin A function in this developmental area.
 - a) **Short Term Outcomes:** The investigators have determined that there is a critical narrow developmental window during early avian development at the neurulation stage, when vitamin A in the form of retinoic acid is essential for subsequent developmental events to proceed normally. If retinoic acid is

absent at this critical time, many developmental events, including cardiovascular development, proceed abnormally, resulting in early embryo lethality. The administration *in ovo* of retinoic acid to the embryo prior to the time of this window or even during this window, rescues the vitamin A deficient embryo so that its development proceeds normally (see Figure 13, below). Specifically, the investigators have discovered that heart tube morphogenesis is impaired in the early vitamin A deficient embryo, and that heart asymmetry specification is dependent on the presence of vitamin A. They have identified several heart asymmetry genes that are regulated by retinoic acid and demonstrated that without vitamin A heart sidedness is random, i.e. in half the vitamin A deficient embryos the heart is on the right side, while in the other half, the heart is on the left side. They have discovered that vitamin A is required for primitive hematopoiesis. They have mapped the expression of retinoid receptors in the early normal and vitamin A deficient quail embryos and analyzed the expression of various cardiogenic genes and determined whether or not they are regulated by vitamin A and retinoic acid. They have identified the critical role of vitamin A in embryonic blood vessel formation in the avian embryo and examined the potential roles of the global growth factor TGFbeta genes in vitamin A-regulated cardiovascular development. Finally, they have developed a quail embryo culture to examine specifically the cellular and molecular events of early cardiovascular development. This project received a competitive renewal in 2004. To date, results from this project have led to 12 publications in peer-reviewed journals (see evidentiary materials).

Figure 13. Normal (left) and vitamin A Deficient (right) quail embryos.



- b) **Medium Term Outcomes:** Work on this project is continuing. Results of this project increase our knowledge about the role vitamin A plays in embryonic development, specifically as it relates to the cardiovascular system. This knowledge leads to improved dietary guidance regarding vitamin A intake for pregnant women and for women of childbearing age.
- c) **Long Term Outcomes:** Improved vitamin A nutrition of women of childbearing age leads to fewer vitamin-A related heart defects in newborn infants.

- 2) In FY 2002, a three-year NRICGP grant of \$220,000 was awarded to the University of Connecticut for a project entitled "Taste Genetics and Dietary Risk of Cardiovascular Disease." Objectives of the project are: 1) to measure the relationship between taste genetic phenotype and oral sensations, dietary behaviors that increase cardiovascular disease (CVD) risk, and measures that show or suggest the development of CVD risk in females; 2) to test if taste genetics affects CVD risk in females by influencing oral sensations and

dietary behaviors; and 3) to use the taste phenotype to increase the understanding of gene control of genetic variation in taste and provide preliminary examination of the ability of gene-based classification to predict dietary behaviors and CVD risk. Data collected included phenotypical measures of taste genetics (perceived bitterness of 6-n-propylthiouracil (PROP) and number of taste papillae on the tongue tip) genotyping for taste genes, sensory analysis, and assessment of food preferences and intake as well as indicators of heart disease risk (blood cholesterol, blood pressure and body fat).

- a) **Short Term Outcomes:** The investigators found that nontasters, those individuals tasting PROP as least bitter and having the lowest number of taste papillae, have higher dietary intakes of alcohol, added sugars, and fat. These dietary behaviors could increase their risk for increasing body weight and for CVD. Nontasters report consuming vegetables more frequently than tasters, a dietary behavior that could decrease their risk for CVD. To date, results from this project have led to 14 presentations at professional society meetings, including The Association of Chemoreception Sciences Meeting, 2003, 2004 and 2005, the International Congress of Dietetics Meeting, 2004, and the American Dietetic Food and Nutrition Conference and Exposition, 2005. Ten journal publications and one book chapter have also resulted from this project and are available in the evidentiary materials section of this report. Additional manuscripts for journal publication and an invited book chapter are in preparation.
 - b) **Medium Term Outcomes:** Results from the study can be used by educators and practitioners to design food-based interventions for women to prevent heart disease and obesity that are matched to oral sensory palates. Market research consistently documents that taste is the primary concern of consumers when making food choices. Therefore, interventions matched to the taste genetics of the targeted individuals are more likely to be successful than traditional interventions.
 - c) **Long Term Outcomes:** Because of the information they have received from interventions targeted to their taste genetic profile based on the results of this project, consumers make more healthful food choices.
- 3) In FY 2003, a one-year NRICGP conference grant was awarded to provide \$15,000 for support of the 27th National Nutrient Databank Conference. This conference is held annually to provide a forum where scientists involved in generating and/or using food composition data can share their work and discuss problems and issues involved in food composition activities.
- a) **Short Term Outcomes:** CSREES funding provided support for travel for scientists who attended the conference to present their research results and for publication of the conference proceedings in a special issue of the *Journal of Food Composition and Analysis* (see evidentiary materials). Approximately 150 scientists, educators, and clinicians attended the conference; the program included 55 oral presentations and 87 poster presentations. Those who made oral presentations were invited to submit papers for publication; 32 papers were accepted for publication in conference proceedings. The conference and resulting publication helped to advance the skills of scientists who attended and provided guidance to students and practitioners. The Scientific Advisory Committee for the conference competed for and received an additional grant in FY 2005 to support the 29th National Nutrient Databank Conference.
 - b) **Medium Term Outcomes:** Educators and practitioners who attended the conference or read the proceedings use the information to provide updated information about food composition to their students and to consumers, or to guide future research endeavors. During the 16 months since the proceedings from the conference have been published, research presented at the conference has been cited by eight other research articles. Participation in the conference furthers the careers of scientists and students resulting in more researchers in the area of food composition.

- c) **Long Term Outcome:** Because of the updated information they have received at the conference, educators are able to provide more information about food composition to consumers, and policy makers are able to provide updated information on food labels. Because of the additional information they have received from food labels and nutrition educators about food composition, consumers are able to make more healthful food choices.
- 4) In FY 2003, a three-year NRICGP grant of \$265,000 was awarded to Texas A & M University for a project entitled “Nutritional Modulation of Immunity: Regulation of TH1/TH2 Responses.” The goals of the project are: 1) to elucidate the mechanism by which dietary omega-3 polyunsaturated fatty acids (n-3 PUFA) modulate T-cell subset activation, which impacts the inflammatory response, and 2) to determine the extent to which n-3 PUFA alter T-helper (Th) subset balance *in vivo* and modulate the response to a specific antigen in a mouse model.
- a) **Short Term Outcomes:** The investigators have demonstrated that dietary docosahexaenoic acid (DHA) suppresses normal T-lymphocyte responses via alterations in cell membrane related signaling events. This is the first information known about the molecular mechanism by which n-3 PUFA suppress the inflammatory process. Thus far, this project has resulted in six peer-reviewed publications (see evidentiary material).
 - b) **Medium Term Outcomes:** Increased knowledge about how dietary factors suppress the inflammatory process are used to plan interventions to prevent the development of chronic diseases for which inflammation is a risk factor, such as cardiovascular disease and arthritis.
 - c) **Long Term Outcomes:** Improved interventions based on the results of this project lead to a reduction in risk for vulnerable populations for diseases for which inflammation is a risk factor, such as cardiovascular disease and arthritis.

Bioactive Food Components

- 1) In Fiscal Year 2000, a four-year Initiative for Future Agriculture and Food Systems (IFAFS) grant of \$2,500,000 was awarded to the University of Arkansas for a project entitled “Health Benefits of Functional Foods from Mid-South Crops.” The objectives of this project were: 1) to quantify the levels of bioactive phytonutrients in economically important crops specific to the mid-south region of the U.S. (blueberries, red grapes, watermelons, spinach and rice), 2) determine the effect of maturation on phytonutrient content, 3) identify optimal postharvest procedures to retain the nutritional quality of the crops, 4) develop laboratory and pilot scale methods for extracting, concentrating and stabilizing bioactive phytonutrients in the targeted crops, 5) identify bioactive compounds with potential health benefits in the targeted crops, and 6) develop outreach programs for consumers on the health benefits and efficacy of phytonutrients-rich functional foods.
- a) **Short Term Outcomes:** The investigators have determined that anthocyanins from red grape skins improve insulin sensitivity *in vivo* in a mouse model and in tissue culture. They have also found that oryzanol compounds in rice bran and rice bran oil have a cholesterol-lowering effect in a rat model due to increased cholesterol and bile acid excretion. Two publications have resulted from the project to date and are located in the evidentiary materials section of this report.
 - b) **Medium Term Outcomes:** As part of this project, investigators are developing a video, a four to six page fact sheet, a consumer-oriented Web page, and educational exhibits to disseminate the outcomes

of their research to educators and consumers. They are also preparing a teaching guide with background information, lesson outline, overhead masters and suggested activities for use by county extension agents. These materials will be used in outreach activities to consumers in the mid-South to teach them about the health benefits of locally grown produce.

- c) **Long Term Outcomes:** Because of the information on the health benefits of locally grown produce that they have received from materials developed as a result of this project, consumers in the mid-South choose more locally grown fruit and vegetables. Changes in consumers' food choices lead to improvements in their health and economic benefits for local fruit and vegetable producers.
- 2) In FY 2001, a three-year National Research Initiative grant of \$125,000 was awarded to Oregon State University for a project entitled "Natural Colorants and Nutraceuticals from Fruit Juice Processing Wastes." The objectives of the project were: 1) to determine the anthocyanin pigment and polyphenolic composition of apple, blackberry and blueberry components that are normally waste by-products of juice processing, e.g., peel or skin, pulp, seeds or core material and 2) to measure the antioxidant values of isolated fractions and individual compounds.
 - a) **Short Term Outcomes:** The investigators found that waste products from juice processing are rich in anthocyanin pigments and polyphenolic compounds, including ellagic acid, which has anti-carcinogenic properties. Four journal publications have resulted from this project to date and are available in the evidentiary materials section of this report.
 - b) **Medium Term Outcomes:** A blackberry juice processor in the Pacific Northwest has modified their processing conditions to circumvent haze-sediment formation and recover a useful by-product, based on information obtained from this project. Other anthocyanin pigments can be extracted from waste products and used as a natural food colorant. Based on these research results, polyphenolic compounds can be extracted from waste products to produce nutraceutical products.
 - c) **Long Term Outcomes:** A reduction in waste by-products from juice processing means less material is taken to landfills, which leads to environmental benefits. The availability of nutritionally enhanced food products in the marketplace increases, allowing consumers to make more healthful food choices.
 - 3) In Fiscal Year 2001, a four-year IFAFS grant of \$250,000 was awarded to the Ohio State University for a project entitled "A Model system for Function Foods: Tomato Products Containing Soy." Objectives were: 1) to develop nutritionally enhanced tomato-based products containing soy, 2) to determine bioavailability of nutritionally optimized tomato-based products containing soy using *in vitro* models and by conducting human bioavailability studies, and 3) to implement education programs and marketing recommendations for these foods.
 - a) **Short Term Outcomes:** The investigators found that the addition of soy ingredients to high-lycopene tomatoes increased viscosity and prevented separation, improving the stability of the juice product. The investigators used an *in vitro* model of digestion and discovered that transfer of lycopene from tomato matrix to micelles was higher in the tomato-soy product than in tomato juice alone, suggesting that the addition of soy enhances the bioavailability of lycopene from tomato juice. The tomato juice with soy was tested in a clinical study to understand the role of isoflavones and carotenoids and data from that study are currently being analyzed. Marketing, firm structure, and the cost of production, processing and distribution of functional foods such as the tomato juice with soy were assessed along with revealed preference studies of consumer interest. To date, four peer-review publications have resulted from this work. Copies of the publications are located in the evidentiary materials section of this report.

- b) **Medium Term Outcomes:** A new value-added product from Ohio tomato and soy is produced for testing in multicenter clinical trials to determine its ability to reduce risk factors for the development of cancer and other chronic diseases. This project is also intended to serve as a model for procedures to use in the development and study of functional food products.
 - c) **Long Term Outcomes:** Based on the outcomes of the original research and the clinical trials, a nutritionally enhanced, high-lycopene and soy tomato juice is available to consumers at the retail level, allowing an additional food choice they can make to improve health.
- 4) An integrated research/extension Multistate Research Fund project (NE-172), entitled “Nutritional Risk and Antioxidant Status in the Elderly,” 1999-2004, has just completed its third five cycle. Experts in the fields of antioxidant research and nutrition requirements of the elderly representing nine North East universities were involved in the most recent project. The investigators have shown that blood and tissue concentrations of certain antioxidants may serve as biomarkers of dietary intakes of fruit and vegetables. For example, the ORAC (oxygen radical absorbance capacity) value increases significantly with the consumption of blueberries. NE-172 researchers have found that the carotenoids lutein and zeaxanthin are selectively sequestered in the macular region of the human retina where they are collectively known as macular pigment. Since humans do not synthesize carotenoids, the origin of the pigment must be the diet. According to NE-172’s work and in agreement with the USDA food composition tables, the most concentrated dietary sources of lutein include the green leafy vegetables, spinach and kale. Dietary patterns that feature fruit, vegetables and grains (and their biomarkers) were associated with more optimal weight status and other physiological markers of health in older adults. A screening tool to estimate carotenoid intake and a program to calculate actual carotenoid values were developed, tested and validated against 3-day food records and food frequencies in an older, low-income population. Evaluation of knowledge, attitudes and barriers related to the intake of fruit and vegetables revealed the need to educate older consumers in the areas of lutein/antioxidant food sources and the association between the intake of carotenoid rich foods and prevention of age-related macular degeneration. In addition, the NE-172 team developed strategies to improve the environmental availability of fruit and vegetables through community emergency food systems and to improve the availability and quality of relevant nutrition information to older food pantry participants using train the trainer techniques. An historical review and a collection of papers representing some of the work of this project was published in *Topics in Clinical Nutrition* (see evidentiary material).
- a) **Short Term Outcomes:** Researchers have developed a better understanding of the biomarkers of antioxidant status and eye health and their relationship to the intake of fruits and vegetables. Nutrition education researchers have increased their understanding of the informational needs of the elderly in relation to diet and health, especially eye health.
 - b) **Medium Term Outcome:** Based on the short term outcomes, researchers are able to assess antioxidant status and fruit and vegetable intake of individuals. Nutrition educators will be able to objectively evaluate educational and environmental intervention programs intended to increase fruit and vegetable intake.
 - c) **Long Term Outcomes:** In addition to improvements in overall health, increasing fruit and vegetable intake could prevent or delay the onset of age-related macular degeneration, one of the leading causes of visual impairment. Therefore improving eye health will have a significant effect on the quality of life of seniors and significantly reduce health care costs.
- 5) In FY 2003, a two-year National Research Initiative grant of \$134,827 was awarded to the University of Florida for a project entitled “Health Benefits of Red Muscadine Wine.” The objectives of the project are:

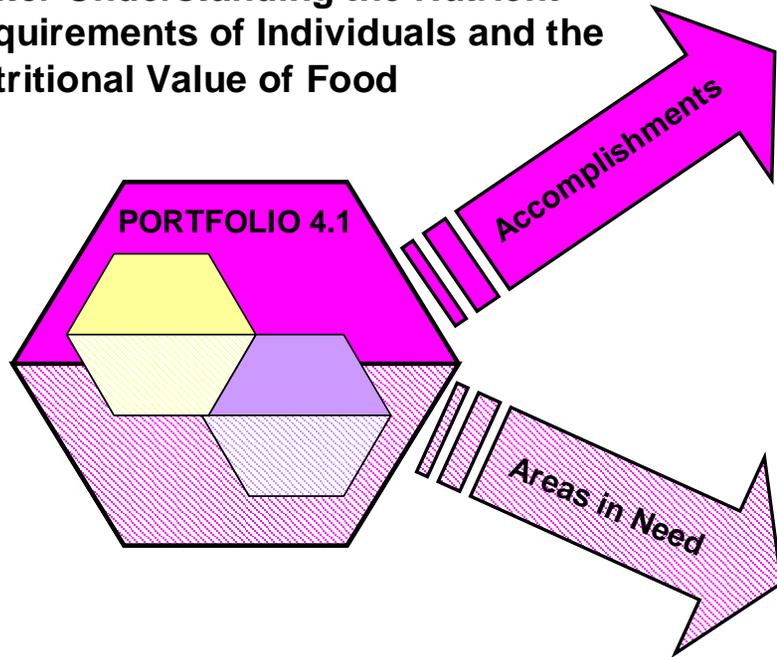
1) to determine the health benefits of wines made from red muscadine grapes (*Vitis rotundifolia*) and 2) to compare them to traditional wines made from vinifera (*V. vinifera*) grapes. Muscadine grapes can be grown in the southern U.S., where Pierce's disease results in the death of most vinifera plants.

- a) **Short Term Outcomes:** The investigators found that muscadine wine contains ellagic acid, a potent anti-cancer agent, which is not present in cabernet. Preliminary results of the project were published in 2003; a copy of the publication is located in the evidentiary materials. Additional publications are in preparation.
- b) **Medium Term Outcomes:** Based on their preliminary research results, the investigators added some anti-neoplastic transformation studies to their project. Final results of the project will inform grape growers and wine producers in the southern U.S., who can use this information to market their products and increase sales of this particular grape species. Educators and practitioners can inform their clients who drink wine of the health benefits of wines made from muscadine grapes.
- c) **Long Term Outcomes:** Grape growers and wine producers in the South, where vinifera grapes cannot be grown but muscadine grape can, are able to expand production. Because of the addition of new wines made from muscadine grapes to the marketplace, more healthful wine choices are available to consumers who drink wine.

Figure 14 is a honeycomb model representing Portfolio 4.1. As stated previously, honeycomb figures represents a whole that can be subdivided into interrelated parts. In this case the whole represents the Portfolio itself and the smaller honeycombs represent the two identified Major Areas of focus within the body of work done under the portfolio. This graphic is meant to serve as a tool to highlight one accomplishment (success story) and one related area of need (new direction) for each Major Area of focus. It is meant to be an outline which introduces the reader to what will be discussed more in depth throughout the text not and is not an all inclusive sample.

Figure 14

Portfolio 4.1: Improve Human Health by Better Understanding the Nutrient Requirements of Individuals and the Nutritional Value of Food



Portfolio 4.1 – Major Areas of Focus

-  Basic Nutrient Requirements
-  Bioactive Food Components

-  •An assay for a copper-containing enzyme in human blood has been improved. Work on development of a biomarker of copper status will lead to improved methods of assessing copper status in people with marginal dietary copper intakes.
-  •New varieties of carrots that contain enhanced levels of bioavailable beta-carotene, lutein, lycopene and anthocyanins have been developed.

-  •Biomarkers to assess status for other nutrients need to be developed. Because most Americans do not suffer from severe nutrient deficiencies, yet marginal deficiencies can still have significant health effects, biomarkers should be sensitive enough to determine which individuals have marginal intakes.
-  •More information is needed about the mechanisms by which bioactive food components impact health, and about the dietary levels needed to achieve such impacts. This information can then be used by policy makers to determine marginal intakes in individuals.

SUCCESS STORIES

Basic Nutrient Requirements

- 1) In Fiscal Year 2001, a three-year NRICGP grant of \$250,000 was awarded to the University of Minnesota, Duluth, for a project entitled “Biochemical Assessment of Nutritional Copper Status.” The objectives of the project are: 1) to optimize the assay for peptidylglycine α -amidating monooxygenase (PAM), a copper-dependent enzyme, for human plasma, 2) to characterize plasma PAM, 3) to determine if changes in copper status alter PAM protein expression, and therefore can be used to assess copper status, 4) to characterize the impact of dietary copper, age, pregnancy, and lactation on PAM, 5) to determine the impact, if any, on altered inflammatory responses on PAM, and 6) to test the hypothesis that copper deficiency limits the functional activity of PAM *in vivo*. Because copper is needed for central nervous system development, there is a need to develop a biomarker for copper status that can be used in vulnerable populations, such as pregnant women and infants.
 - a) **Short Term Outcomes:** During their efforts to optimize the PAM assay in plasma, the investigators discovered that copper chaperone protein (CCS) for copper, zinc-superoxide dismutase (SOD1) is very sensitive to copper status in rodents. They are continuing their work to determine if this is also true in humans and if the ratio of SOD1/CCS can be used to assess copper status in humans using either red blood cells or white blood cells. To date, this work has resulted in three peer-reviewed publications (see evidentiary material).
 - b) **Medium Term Outcomes:** The availability of a sensitive blood biochemical marker of copper status allows for improved assessment of copper status, particularly for people with marginal copper intakes. This assay could be used with population surveys such as the National Health and Nutrition Examination Survey (NHANES) to provide new knowledge about the copper status of the U.S. population. This new knowledge is disseminated to educators, practitioners and students via journal articles, Web pages, etc.
 - c) **Long Term Outcomes:** Improved knowledge about the copper status of the population allows educators and practitioners to design interventions specifically for vulnerable populations. These interventions will provide consumers with marginal copper intakes information about foods that can enhance dietary copper intake. The interventions will therefore help at-risk consumers make wiser food choices and improve their copper nutritional status.
 - d) **Impact:** The development of a new sensitive biomarker for copper nutritional status will allow for improved nutritional assessment of the population. It will particularly help in the assessment of vulnerable groups, such as pregnant women and infants, about which little is known with regards to copper status and provide new knowledge about copper requirements which can be used in revising Dietary Reference Intakes.
- 2) In FY 2000, an IFAFS grant of \$3,750,000 was awarded to Purdue University for a project entitled “Improving Bone Health in Adolescence through Targeted Behavioral Intervention.” The work was done collaboratively with the University of Hawaii, Washington State University, University of Arizona, University of California-Davis, University of Nevada, Utah State University, Southern Illinois University, Ohio State University and the USDA Western Human Nutrition Research Center. The purpose of the study was to develop, implement and evaluate a two year, multi-site behavior intervention for Asian, Hispanic, and Caucasian adolescent females designed to increase their calcium intake from dairy and non dairy food sources and to determine the relationship between levels of calcium intake and bone health. These ethnic

groups were chosen because of their vulnerability to osteoporosis later in life. The total number of students participating in the project was 3,509. Evaluations and numerous measures of related psychological and physiological factors were made.

- a) **Short Term Outcomes:** An interactive multimedia Bone Health DVD/CD-ROM was developed meeting school math and science standards. It was well received and won the Association for Communication Excellence in Agriculture's Gold Award for the most innovative educational intervention. Measurement and/or evaluation of calcium intake, psychological parameters and bone health is ongoing and publications are in preparation. Data on calcium intake and bone accretion will provide a basis for recommended dietary intakes of calcium at a crucial period of bone development.
- b) **Medium Term Outcomes:** It is expected that the data will provide convincing evidence of the importance of calcium intake for adolescent female bone development. If the Bone Health DVD proves successful in increasing calcium intake, it will be readily adopted by schools as a model program.
- c) **Long Term Outcomes:** If the Bone Health DVD successfully increases calcium intake which subsequently improves bone health, it is expected that it would be widely used in schools, resulting in an improvement in bone health and a decrease in osteoporosis later in life.
- d) **Impact:** The development and use of a multi-media science curriculum to increase calcium intake in adolescent females provides the opportunity for reaching large segments of the population at risk for later development of osteoporosis with targeted information, leading to a decrease in osteoporosis later in life.

Bioactive Food Components

- 1) In FY 2000, a four-year IFAFS grant of \$750,000 was awarded to USDA's Agricultural Research Service for a project entitled "Design and Assessment of Nutritionally Enhanced Carrots with Unusual Pigments." The objectives of the project were to develop high-pigment, high culinary quality genetic stocks and molecular markers for use by the carrot production industry, grow carrots with high levels of carotenoids and anthocyanins, evaluate the bioavailability of carotenoids and anthocyanins from these carrots in humans, and educate growers, seed companies and the public.
 - a) **Short Term Outcomes:** The investigators were able to produce carrots with unusual pigments and high levels of beta-carotene, lutein, lycopene and anthocyanins (see Figure 15 below). Collaborators at the University of Wisconsin found that gerbils fed the high beta-carotene carrots had more than 2 times higher serum beta-carotene levels and 1.1 times greater vitamin A liver stores compared to gerbils fed typical orange carrots. They also found that phenolics including anthocyanins and phenolic acids in purple carrots do not interfere with the bioavailability of beta-carotene from purple carrots and that the lutein and lycopene in the specialty red and yellow carrots are bioavailable. Three publications have resulted from this project to date (see evidentiary materials).

Figure 15



- b) **Medium Term Outcomes:** The investigators have done sensory testing of the new carrot varieties and have found that the new colors enhance the appeal of carrots for consumers. Information about the nutrient content of unusually pigmented carrots is being disseminated to growers, researchers and consumers to inform them about potential health benefits of these new varieties of carrots. Results of the project were highlighted in the November, 2004 issue of *Agricultural Research* magazine (<http://www.ars.usda.gov/is/AR/archive/nov04/carrot1104.htm>). In FY 2004, a four-year NRICGP grant of \$652,500 was awarded to the University of Wisconsin collaborator on the project, Dr. Sherry Tanumihardjo, for a project which builds on the results of this project. The new project, entitled “Promotion of High Vegetable Consumption as a Weight-loss Strategy and General Well-Being” is a clinical trial in adult humans of a high vegetable diet that includes the unusually pigmented carrots being tested as a weight loss intervention. This project also includes the use of the Cooperative Extension Service to promote vegetable consumption throughout the state of Wisconsin.
- c) **Long Term Outcomes:** It is anticipated that because consumers find the new colored carrots to be appealing, more producers will grow these new varieties of unusually pigmented carrots. This will in turn lead to more carotenoid-rich vegetables in the marketplace, increased carotenoid intakes by consumers, and improved health outcomes.
- d) **Impact:** By determining the efficacy of unusually colored carrots as a source of nutrients and disseminating this information to growers, researchers, and consumers, this project will lead to the availability of new healthful vegetable choices in the marketplace. It is anticipated that this will lead to increased carotenoid intakes by Americans and an improvement in their health.

NEW DIRECTIONS

In Fiscal Year 2005, changes were made in the NRICGP “Improving Human Nutrition for Optimal Health” program in response to stakeholder input and to the availability of additional funds for projects on obesity prevention. This will lead to several important changes in the types of projects funded under KA 701 and 702. The title of the program was changed to “Bioactive Food Components for Optimal Health” and the focus of the program became narrower. Nutrition education research projects were eliminated from this program and moved to the new “Human Nutrition and Obesity” program, effectively making more funds available for research on food composition and requirements and function of nutrients and other food

components. The priority areas for the program for 2006 focus on metabolism of bioactive food components and understudied nutrients. To ensure that the focus remains on food, studies on pharmacologic levels of bioactive components are excluded from the program.

Another trend in competitive programs is that fewer, larger awards are being made for longer time periods, within CSREES's legislative restrictions. For example, in the NRICGP "Improving Human Nutrition for Optimal Health" Program in FY 2000 the average total award was for \$180,400 for 2.3 years. By FY 2004, the average total award had increased to \$375,000 for 2.9 years. The decision to make larger awards was based on stakeholder input from professional societies, peer review panel members and panel managers, and individual investigators. Because funding for the program has not increased appreciably during this time, giving larger awards means fewer awards are made each year. However, giving larger awards for a longer time period means investigators are spared the uncertainty and disruption of applying for renewals as often. Additionally, supporting fewer proposals with larger awards allows CSREES to give more emphasis to projects with the most potential to make meaningful contributions to high-priority outcome areas. It is likely that the trend toward larger awards will continue into the near future.

A potential gap in funding exists in that the agency no longer funds integrated research, extension, and education competitive projects under KA 701 and 702. Such projects were funded under the IFAFS program in 2000 and 2001, and several of them are cited here as specific examples and success stories. Discussions are under way to determine if a new "Functional Food" program in the NRICGP can be offered without requiring the use of new funds by taking some funds from several existing NRICGP programs.

Reference:

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EVIDENTIARY MATERIALS (Portfolio 4.1)

Award #00-35200-9062, Function of Vitamin A in Quail Embryogenesis

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Version: January 18, 2006

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PORTFOLIO 4.2- Promote Healthier Food Choices and Lifestyles

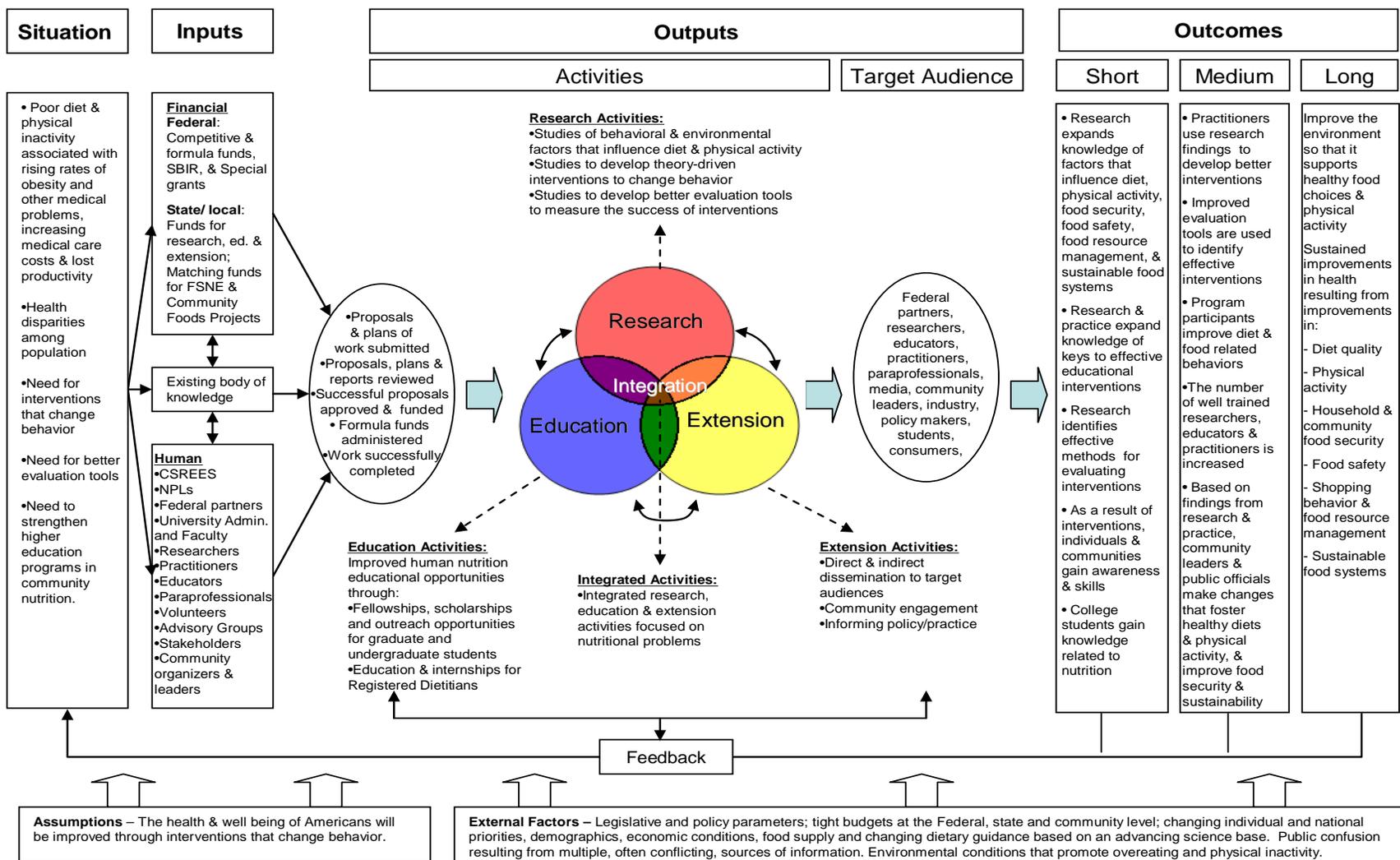
Knowledge Area 703: Nutrition Education and Behavior; and Knowledge Area 704: Nutrition, Hunger and Food Security in the Population

OVERVIEW

The work conducted in Portfolio 4.1 on nutrient composition, requirements and function is the basis of guidance on diet and physical activity. Portfolio 4.2 - “Promote healthier food choices and lifestyles” has a strongly integrated balance of nutrition education research and extension/outreach programs. Nutrition education research encompasses two broad themes –first, understanding the behavioral factors that influence choices related to food and physical activity; and second developing and testing intervention programs that help people and communities move from where they are to where they should be. Nutrition education and environmental intervention programs help increase knowledge and change behavior. These areas of nutrition are represented by Knowledge Area 703 “Nutrition education and behavior” and Knowledge Area 704- “Nutrition and hunger in the population.” The following logic model shows how activities in the Portfolio are carried out and the expected outcomes.

Portfolio 4.2 – Promote Healthier Food Choices and Lifestyles:

KA 703 Nutrition Education and Behavior and KA 704 Nutrition and Hunger in the Population



SITUATION

Dietary factors are associated with four of the ten leading causes of death in the United States. Diet related health conditions in the United States cost over \$200 billion every year in medical expenses. Based on dietary intake data or evidence of public health problems, children and adults have on average less than the recommended intake of calcium, potassium, fiber, magnesium and vitamin E. Adults may also have low intakes of vitamins A and C. At the same time, in general, Americans consume too many calories and too much saturated and trans fats, cholesterol, added sugars and salt.

Over time excess calorie intake and insufficient physical activity results in overweight and obesity. Data from the National Health and Nutrition Examination Survey for 1999-2002 indicate that an estimated 65 percent of U.S. adults are overweight or obese (www.cdc.gov/nccdphp/dnpa/obesity/trend/index.htm). This represents a prevalence 16% higher than age-adjusted data from 1988-94. The situation is even more alarming among children. Using a definition of overweight as greater than or equal to the 95th percentile of the age- and sex-adjusted Body Mass Index (BMI), 16 % of children and adolescents (6-19years of age) were estimated to be overweight in 1999-2000. This represents a 45% increase from the overweight estimates of 11% obtained in 1988-94. Because of the rapid rise in obesity and overweight and the seriousness of the related health problems, obesity is now considered a major health problem of epidemic proportions.

The data cited above relate to the population on average. The numbers do not reflect the serious disparities in health among population subgroups. The prevalence of those in the highest weight category (BMI equal to or greater than 30) tends to be highest among minority groups. Findings from the 1999-2002 National Health and Nutrition Examination Survey (NCHS, Health, United States, 2004 Chart book on Trends of the Health of Americans. Hyattsville, MD, 2004 www.cdc.gov/nchs/data/hus/04trend.pdf) for adults 20-74 years of age show more adult women are obese (34%) than men (28%). The problem is greatest among non-Hispanic black women with 50% being obese compared with 39% of Mexican-American women and 31% of non-Hispanic white women. However, there was very little difference in obesity levels among men based on race/ethnicity.

USDA has been providing dietary advice to Americans since the early 1900's. Beginning in 1980 and every five years thereafter, USDA and HHS have jointly published the Dietary Guidelines for Americans. These Guidelines are a statement of Federal nutrition policy and as such are the basis for all Federal and Cooperative Extension System nutrition education and other intervention efforts. However, as indicated above, there is much need for improvement in the American diet. According to USDA's Healthy Eating Index, only 10 percent of the U.S. population had a "good" diet in 1999-2000 (Basiotis, P.P., Carlson, A., Gorrion, S.A., Juan, W.Y., & Lino, M. 2002 The Healthy Eating Index: 1999-2000. USDA, CNPP-12). Although providing information about healthy diets and lifestyles may be an important first step, it is usually not enough to change behavior. A better understanding of the factors that influence consumer behavior related to food and physical activity is needed. Educational and other types of intervention strategies need to be built upon an expanded knowledge base of how to influence behavior. Interventions should motivate people to improve their diet and physical activity and provide them with the skills needed for change. In addition, there is a continuing need for sensitive evaluation tools that can detect the successful components of interventions so that they can be replicated.

Many factors can influence a person's diet and physical activity including genetic, physiological, psychological, sociological and environmental factors. The complex nature of nutrition issues requires that researchers, educators and practitioners take a multidisciplinary approach to problem solving. College course work and experiential learning activities are needed to prepare nutrition students for the multifaceted problems they will face after graduation. In addition to an in depth knowledge of nutrition, students need enough of an appreciation of related disciplines, like psychology, sociology, education, communication and exercise physiology to be an effective team member.

ASSUMPTIONS

Given the scope and complexity of nutritional problems, it should be clear that many entities need to be involved in the search for solutions. CSREES will continue to work with other USDA and other Federal agencies, and with its state university partners. One of the important assets of the Cooperative Extension System is its ability to develop working relationships with community leaders to effect change in the community. Through this network, CSREES has the potential to reach the Federal, state and local levels.

Research supported in Knowledge Area 703, *Nutrition Education and Behavior* and Knowledge Area 704, *Nutrition, Hunger and Food Security in the Population* will provide information on the salient factors that influence choices related to diet and physical activity. These factors include individual, family and community level factors. Using this information, appropriate educational and environmental interventions will be developed. The interventions will be evaluated using sensitive tools and the successful interventions will be replicated to improve the health of Americans by improving their diet and physical activity.

EXTERNAL FACTORS

In addition to the External Factors mentioned in Chapter II on the overall Nutrition Portfolio, there are several factors that are particularly important to Portfolio 4.2:

- Public confusion can result from changes in dietary guidance, the introduction of new foods and changes in the nutrient composition of food.
- Community structure and involvement can have a strong effect on the ability of consumers to achieve healthy patterns of eating and physical activity.
- Family structure, time usage and technology influence knowledge and skills related to food production, selection and preparation.
- Emphasis on academic achievement in the schools reduces the focus on life skills training as well as good nutrition and physical activity.
- The current environment in the United States encourages people to overeat and promotes obesity. Food is constantly available, relatively inexpensive and heavily advertised. On the other hand, modern conveniences in the home, in transportation and in the labor market have led to decreased physical activity.

INPUTS

Financial

Table 17 shows the sources of CSREES funding for research projects and integrated research, education and extension projects in Knowledge Area 703, *Nutrition Education and Behavior* found in CRIS. Where available, funding for each of the nutrition extension/outreach programs will be discussed individually. These include nutrition programs of the Cooperative Extension System, EFNEP, FSNE, Maternal and Child Health program, and the Community Foods Competitive Grants Program. Data for Knowledge Area 704, *Nutrition, Hunger and Food Security in the Population* is not available because it is new and has not yet been used to classify projects. Table 17 shows that total funding for research and integrated projects coded as KA703 was much higher in 2000 and 2001 than in 2002 and 2003 and somewhat higher than in 2004. Most of the decline is in the “Other” category. This reflects funds available from IFAFS which was in place only in these earlier years. This loss of funding had a negative impact on nutrition education research, especially on large multi-site projects. Until 2004, funding available from the National Research Initiative (NRI) Competitive Grants Program was about the same as formula funding (Hatch) to the 1862 land-grant universities. Funding to the 18 Historically Black

Colleges and Universities (Evans-Allen) for nutrition education research decreased over the period from \$1,395,000 in 2000 to 825,000 in 2004, while Hatch funding remained relatively stable during this period. NRI funding increased appreciably in 2004 because of dollars dedicated to obesity related research and this funding ranked second in CSREES total dollar contributions for the five year period.

Table17: CSREES Funding for Nutrition Education and Behavior (703) by Source, 2000-2004

Funding Source	Fiscal Year (in thousands)					Grand Total
	2000	2001	2002	2003	2004	
Hatch	\$ 977	\$ 1,192	\$ 1,112	\$ 1,006	\$1,166	\$5,453
Mc-Stn	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Evans Allen	\$ 1,395	\$ 1,378	\$ 1,519	\$ 862	\$ 825	\$5,979
Animal Health	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Special Grants	\$ 44	\$ 114	\$ 118	\$ 588	\$ 640	\$ 1504
NRI Grants	\$ 665	\$ 1,001	\$ 1,016	\$ 869	\$ 7,746	\$11,297
SBIR Grants	\$ 260	\$ 271	\$ 0	\$ 0	\$ 160	\$ 691
Other CSREES	\$ 8,846	\$ 7,067	\$ 680	\$ 400	\$ 342	\$17,335
Total CSREES	\$ 12,188	\$ 11,024	\$ 4,445	\$ 3,726	\$10,978	\$42,361

Existing Body of Knowledge

The body of knowledge for recommendations on diet and physical activity is very strong. However, the body of knowledge for effective methods of intervening to help people change their behavior and improve their diet and physical activity is less well established. In addition, there is a need for valid, reliable instruments to evaluate the effectiveness of intervention programs. Educators must rely on emerging knowledge from nutrition education research and on the collective knowledge of strategies that make intuitive sense and on experience with strategies that have been successful in the past. The very success of nutritional science research can present challenges for nutrition educators who must explain to the public why recommendations have changed and how to implement the recommendations in everyday diets.

Human Inputs

As a field and as a research community, the area of nutrition education research is smaller than the nutritional science research area. However, communication among nutrition education researchers benefits from the university network and professional associations. Much of the focus in nutrition education is in extension/outreach. This is reflected in the CSREES nutrition staff with five of the nine staff members devoting most of their time to community nutrition outreach. These staff members work closely with the state and community leaders that carry out educational and environmental intervention programs. The CSREES staff relies on the Cooperative Extension System network which extends from the Federal office to state specialists at land-grant universities to nutrition educators and paraprofessionals in communities around the country. One factor that has helped to make the Cooperative Extension System successful is its presence in the community and its ability to leverage the support of community leaders.

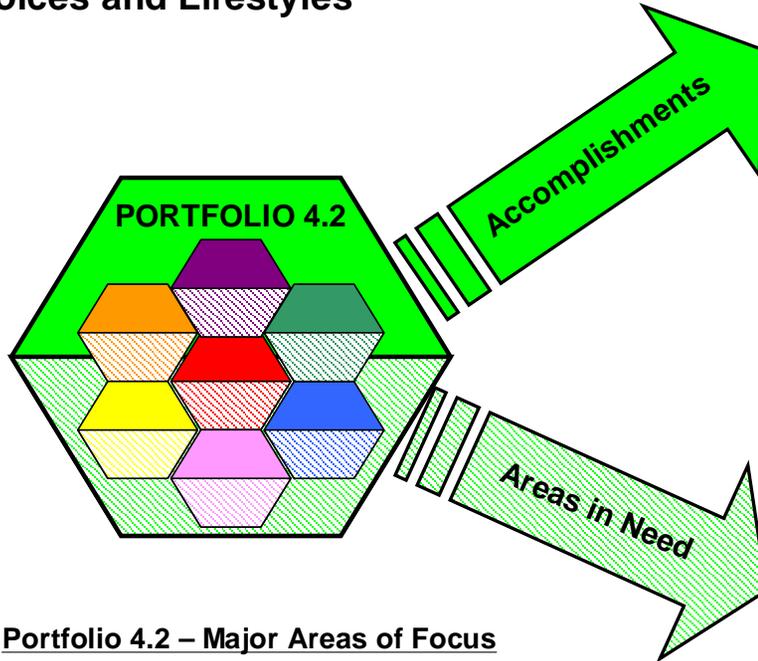
The following sections of this part of Chapter III will address in more detail each of the components of Portfolio 4.2: Nutrition education, behavior and obesity research and integrated research, education and extension

programs; Cooperative Extension System; Expanded Food and Nutrition Education Program; Food Stamp Nutrition Education; Maternal and Child Health; Community Foods Competitive Grants Program; and the 4-H Youth Development Program. As an introduction, the following figure shows a single accomplishment and area of need for the components of Portfolio 4.2.

Figure 16 is a honeycomb model representing Portfolio 4.2. As stated previously, honeycomb figures represents a whole that can be subdivided into interrelated parts. In this case the whole represents the Portfolio itself and the smaller honeycombs represent the Major Areas of focus within the body of work done under the portfolio. This graphic is meant to serve as a tool to highlight one accomplishment (success story) and one related area of need (new direction) for each Major Area of focus. This is meant to be an outline which introduces the reader to what will be discussed more in depth throughout the text not and is not an all inclusive sample.

Figure 16 NOTES!!!!

Portfolio 4.2: Promote Healthier Food Choices and Lifestyles



Portfolio 4.2 – Major Areas of Focus

-  Nutrition Education, Behavior, & Obesity Research & Integrated Research, Education & Extension Programs
-  Cooperative Extension System (CES)
-  Expanded Food & Nutrition Education Program (EFNEP)
-  Food Stamp Nutrition Education (FSNE)
-  Maternal and Child Health Program
-  Community Foods Competitive Grants Program
-  4-H Youth Development Program

-  •A study has shown that serving pre-school aged children large portion sizes increase their entrée consumption by 25% compared to when they serve themselves.
 -  •Reversing Childhood Obesity Trends Project developed a state contacts list, website, and published a Quarterly Newsletter on pediatric research for CES faculty; almost fifty percent of state contacts are participating in coalitions to develop statewide childhood obesity prevention programs.
 -  •Fruit & vegetable intakes increase by almost 2 servings/day, 84 % improve food resource management practices and physical activity increases for about 1/3 of adult clients; youth increase knowledge and skills related dietary choices, food preparation and safety.
 -  •A community nutrition education logic model framework was developed and tested, which showed that national impacts in diet quality and food behaviors could be captured without losing the richness and flexibility of nutrition education implemented according to locally identified needs and resources.
 -  •A research study designed to prevent or reduce premature births by increasing the supply of docosahexanoic acid (DHA) to the pregnant mother through either a functional food supplement or a nutrition intervention was successful and led to a significant 4-day increase in gestational length.
 -  •Kauai's CFP grant increased economic viability for local farmers and food security for residents.
 -  •4-H has been successful in obtaining some private funding to promote healthy lifestyles and decrease childhood obesity.
-
-  •The factors that influence obesity need to be understood well enough to develop effective interventions and sensitive outcome measures for the prevention of obesity.
 -  •The next component of this Initiative will be the development of a Distance Education WEB-CT course focused on healthy weights for children and adolescents to update nutritionists and other health professionals on childhood obesity prevention.
 -  •Better tools for measuring physical activity changes in adults and youth are needed, as well as new strategies for helping clients adopt healthier food and activity practices.
 -  •Refinement and testing of this model for applicability across nutrition programs should allow better documentation of national progress in meeting nutrition goals and detection of the cumulative impact of community nutrition.
 -  •Continued cooperation between researchers and practitioners is needed to conduct the research and then promote appropriate behavior change that will lead to improved pregnancy outcomes and increased breast-feeding.
 -  •The community food program seeks to energize local economies, create food access in low income communities, sustain environmentally sound local food production to help local food systems flourish.
 -  •In the future, more curricula and experienced staff will be needed to work with youth in out-of-school settings.

NUTRITION EDUCATION, BEHAVIOR AND OBESITY RESEARCH AND INTEGRATED RESEARCH, EDUCATION AND EXTENSION PROGRAMS

Work in this area is captured primarily but not exclusively in CRIS classification code KA 703 – Nutrition Education and Behavior. The work involves research, education, extension and integrated projects. The goals are (1) to develop a better understanding of the dietary status of the population, especially of high risk population subgroups, (2) to develop a better understanding of the behavioral and environmental factors that influence choice related to food and physical activity, (3) to develop educational and environmental interventions that lead to improvements in diet and physical activity; and (4) to evaluate the effectiveness of interventions using sensitive evaluation tools which may need to be developed for that purpose. Because of the seriousness of the problem and the multifaceted strengths of the university system, a major focus of the program has become obesity prevention. The research and the integrated research, education and extension work carried out in this emphasis area expand the body of knowledge which is the basis for nutrition education and extension/outreach programs. All the components work together to support the goal of the Portfolio and CSREES’s strategic goal to “Improve the Nation’s Nutrition and Health.”

OUTPUTS

Research

The NRI Competitive Grants Program in 2000 - 2003 supported nutrition education and behavioral research under subsection 31.0 “Human Nutrition and Health.” Funding for educational and behavioral research under this subsection was stopped after 2003 when a separate subsection entitled “Human Nutrition and Obesity” was established to allow focus on educational and behavioral research related to obesity. The new subsection emphasizes integrated research, education and extension projects. There are also Hatch formula funds devoted to nutrition education research. Multistate Research Fund (MRF) projects are five year projects supported by Hatch formula funds to the 1862 universities. Nutrition education research has been the focus of several of these projects. Several Congressionally earmarked projects also focus on nutrition education and behavioral research. Projects carried out in this emphasis area include (1) Studies of behavioral and environmental factors that influence diet and physical activity; (2) Studies to develop theory driven educational and environmental interventions to change behavior; and (3) Studies to develop sensitive evaluation tools to measure the progress of interventions.

Extension

Probably more than in any other area of research, nutrition education research has a direct application to extension work. The results of research and integrated projects are presented to research and extension/outreach professionals through journals and presentations at professional meetings directed towards them. The professional associations with which nutrition education researchers and practitioners interact most are American Dietetic Association (ADA), the American Society for Nutrition (ASN) and the Society for Nutrition Education (SNE). The International Society for Behavioral Nutrition and Physical Activity (ISBPA), the American Public Health Association (APHA) and the Institute for Food Technologist (IFT) also play an important part in knowledge dissemination. The annual meetings and journals of these organizations are a primary means of disseminating findings from CSREES supported research and integrated research, education and extension projects to other researchers, educators and practitioners. Each year, the Food and Nutrition Extension Educators (FNEE) subgroup within SNE holds an all day pre-conference and a business meeting at the SNE annual meeting. These sessions provide a direct, in person opportunity to bring Extension educators up to date on research findings and other activities of special interest to them. Community leaders and public officials also use research finding as a basis for policy changes designed to improve the health of Americans.

Education

Graduate and undergraduate education activities are covered in this report in the Higher Education Theme Area. However, it should be noted here that graduate and some undergraduate work is supported by research and integrated projects. The grant writing process, the work and the presentation of results at professional meetings and in journals is a very important part of the students' education. In addition, CSREES staff have held two to four grant writing workshops each year at sites around the country. These workshops are open to anyone interested in learning more about effective grant writing and in developing a better understanding of the grant approval process. In addition, the new understanding and insights gained from research, extension and integrated projects expand the knowledge base for teaching the next generation of researchers, educators and practitioners.

Integrated Programs

While integrated research, education and extension projects may be new to many areas of research, it is the norm in nutrition education. Because of the closeness of research in this area to the direct application of extension and education work, researchers, practitioners and educators tend to create informal teams. Therefore, the formal mechanisms for integration do not reflect the true extent of teamwork in nutrition education. The Multistate Research Fund (MRF) process, which provides a structure for multistate, long term projects, has long been a mechanism for drawing researchers, educators, practitioners and graduate students together. In recent years, the MRF approval process has required that projects be integrated. A formal funding mechanism that required competitive grant applications to be integrated began with the Initiative for Future Agricultural and Food Systems (IFAFS) which was funded in 2000 and 2001. Almost all of the \$15.6 million awarded in nutrition over these two years was targeted to obesity prevention. Starting in 2003, a section within the NRI was established for competitive, integrated grants focused on obesity prevention. This section has been funded at about \$8 million per year.

OUTCOMES

Short Term

The findings from research, education, extension and integrated projects are disseminated by various means, such as publications, presentations, media reports and via the internet. The findings from nutrition education research expand knowledge of the factors that influence diet quality, physical activity, food security, food shopping, resource management, sustainable food systems and on the barriers to change. Nutrition education research and practice expand knowledge of the characteristics of effective educational interventions. Research sheds light on effective methods and measures for evaluating successful interventions. College students who benefit from high quality course work and experience gain knowledge related to community nutrition.

Medium Term

Based on the short term outcomes, educational interventions are developed by practitioners. Effective interventions are identified using newly developed evaluation strategies. Based on the training they receive, program participants improve their diets and diet related behaviors. Because of the high quality education they receive, the numbers of qualified researchers and practitioners are increased. Based on findings from research and practice, community leaders and policy makers introduce changes that foster healthy diets and physical activity, and improve food security and the sustainability.

Long Term

The health of Americans is improved resulting from improvements in diet quality and physical activity.

SPECIFIC EXAMPLES

- 1) In FY 2004, a four year grant of \$800,000 was awarded for an integrated research/extension project entitled “Hawaii Community Resource Obesity Project.” The work is being carried out by the Waianae Coast Comprehensive Health Center in collaboration with the University of Hawaii and the John A. Burns School of Medicine. The goal is to reduce the prevalence of obesity among Native Hawaiians, who have the highest prevalence of obesity in the world. This project has recently been chosen by CSREES to be featured <https://portal.nifa.usda.gov/web/crisprojectpages/0199051-hawaii-community-resource-obesity-project.html>
 - a) **Short Term Outcomes:** A community-based health network including researchers, health-care workers, farmers, fishermen, and aquaculture producers has been established. From this, awareness of the importance of healthy eating and the production of local healthful foods will be increased.
 - b) **Medium Term Outcomes:** This awareness will positively affect behavior associated with the attainment and maintenance of a healthy body weight. Interest in and yield of locally produced healthful foods will be increased.
 - c) **Long Term Outcomes:** Changes in diet and physical activity will lead to a decline in the prevalence of obesity among Native Hawaiians. An increase in the production of locally grown food will improve the socio-economic viability of the Waianae Coast.

- 2) In FY 2000, an 18 month \$80,000 NRI research grant was awarded for “Bilateral Comparison of Fresh Fruit and Vegetable Consumption: Why Do Americans Eat Poorly” to Arizona State University. The purpose of the project was to study the observation that consumption of fresh fruits and vegetables is much higher in Canada than in the United States. An economic analysis of household panel data was used.
 - a) **Short Term Outcomes:** Higher consumption of fresh fruit and vegetables in Canada compared to the United States was confirmed. Consistent with the Alchian-Allen Effect, which predicts that countries will export commodities of higher quality than those they retain for domestic consumption, this study indicates that quality of fresh fruit and vegetables is higher in Canada. Quality has a positive effect on fruit consumption in Canada. More health and diet information in the United States has a positive effect on vegetable consumption. *Presentations:* American Agricultural Economics Association Meeting, July 2000; Journal of Agricultural and Resource Management, 2005.
 - b) **Medium Term Outcomes:** The implications of this study will be used by both educators and policy makers. Educational and other intervention strategies designed to increase fruit and vegetable consumption will be increased. Policy makers will establish and enforce more strict grading standards for fresh fruit and vegetables to ensure the availability of high quality fresh fruit and vegetables in local US markets.
 - c) **Long Term Outcomes:** Fruit and vegetable intake in the United States will increase to recommended levels and the health of Americans will improve.

- 3) Two NRI research grants were awarded in 2000 and 2002 to Jennifer Fisher at Baylor College of Medicine in Houston, Texas for a total of \$300,000. This work was done in collaboration with two prominent researchers, Leann Birch and Barbara Rolls, at the Pennsylvania State University. The objective of these projects was to determine the effects of large food portions on pre-school aged children's eating. Large portion sizes are believed to contribute to weight gain among children by promoting increased energy intake. Empirical evidence of portion size effects on children's eating, however, is extremely limited. Copies of CRIS reports and publications are in the evidentiary material.
 - a) **Short Term Outcomes:** In the first study, researchers learned that doubling the size of an entrée served to pre-school aged children increased the average size of children's bites, resulting in a 25% increase in entrée consumption and a 15% increase in total meal energy. When allowed to self-determine portion size, children selected and consumed less than when large portions were served to them. In a second study, researchers learned that serving large portion entrees produced increases in daily intake of 6-9% in 59 African American and Hispanic 5-year-old children attending Head Start daycare programs and their mothers.
 - b) **Medium Term Outcomes:** The results of these projects have been communicated through presentations and lay and consumer publication (see evidentiary material). The results clearly show that large portion sizes increase children's bite size and food intake relative to age-appropriate and self-selected portions. The strong findings have led to the development of a new USDA NRI grant application, currently under review, to identify determinants of children's self-served portion sizes.
 - c) **Long Term Outcomes:** The results of this research which provide new evidence characterizing the obesigenic effects of large portions on energy intake in young children and the benefits of allowing children to self-determine intake should set precedent for recommendations and policy concerning the feeding of young children and eventually lead to a reduction in childhood obesity.

SUCCESS STORY

Multistate Research Fund Project

- 1) For the past 15 years researchers and Extension educators from about ten universities have collaborated on projects focused on improving the diets of young adults. The current five-year Multistate Research Fund project (NC219) began in 2001. The group has been successful in using the network that they established through their MRF projects to gain two NRI grants and one IFAFS grant totaling \$3.4 million in competitive funding.

The NC219 research team includes leaders in the field of nutrition education research: Nancy Betts, Oklahoma State University (formerly at University of Nebraska); Linda Boeckner, University of Nebraska; Connie Georgiou, (now emerita from Oregon State University); Geoffrey Greene, University of Rhode Island; Sharon Hoerr, Michigan State University; Tanya Horacek, Syracuse University; Kendra Kattelmann, South Dakota State University; Barbara Lohse, Pennsylvania State University (formerly at Kansas State University); Susan Nitzke, University of Wisconsin-Madison; Mary Jane Oakland, Iowa State University; Beatrice Phillips, Tuskegee University; and Adrienne White, University of Maine.

All of the work supported through these projects has targeted young adults. The period between 18 and 24 years of age is a critical period in the development of life long eating patterns. It is the time when most young people transition from parental control to independent adulthood. In addition, many young adults are

or will soon be starting their own families and modeling behavior that will influence the next generation. Young adults are generally a hard population to reach with traditional nutrition and health education. This is especially true for low income young people who are not in college. This group's IFAFS-funded research has targeted the latter group in their work to promote fruit and vegetable intake.

Increasing evidence of the relationship of food and nutrients to disease has shown the importance of ample dietary intakes of fruits and vegetables. Population data and results from these projects show clearly that young adults do not meet recommended intakes. This group of researchers and their education/extension partners have assessed current intakes of fruits and vegetables by young adults, their interest in improving their diets, motivators and barriers to change, self confidence, readiness to change behavior and preferred methods of interventions. The theoretical basis for intervention strategies has been the Transtheoretical Model (TTM or "Stages of Change") which calls for interventions to be tailored to an individual's readiness to change and adopt a new behavior. For example, a successful intervention for someone not interested in their diet might be to raise awareness of the importance of eating ample quantities of fruit and vegetable. On the other hand, someone who is already interested in improving their health might be motivated by information on selecting and preparing fruits and vegetables. After assessing an individual's stage of change, stage-tailored interventions were developed and evaluated.

- a) **Short Term Outcome:** Since 2001, there have been almost 30 publications and presentations for professional and consumers (see evidentiary material). Graduate students have been an important part of the work. Several M.S. and two Ph.D. degrees have been awarded to students working on these projects. One of the most important short term outcomes of this work has been the development and validation of several tools including those for measuring fruit and vegetable intakes, motivators and barriers to healthful eating, self confidence, ways of making change, outcome measures and mediating factors. Based on this work, understanding of the perceptions and beliefs that drive food behavior change has increased.
- b) **Medium Term Outcomes:** Based on short term outcomes, stage-tailored interventions were developed. These new materials included personalized assessments of diet quality, motivational telephone calls and web-based methodology. Interventions have proven successful in improving diets of young adults. Applications and adaptations to meet the needs of community-based educators are currently being tested and shared with nutrition educators.
- c) **Long Term Outcome:** The compilation of work supported by the Multistate Research Fund and CSREES's competitive grants programs shows the effectiveness of integrated projects that bring researchers and Extension educators together. Using the Transtheoretical Model as a basis for dietary interventions has proven to be a useful strategy. Spin off projects are anticipated using this theoretical model of behavior change. One has already been carried out as part of a Ph.D. dissertation with a Native American population in Kansas. The most recent funding for this group of researchers has been in 2004 for a NRI-funded project entitled "Behavior Change for Obesity Prevention in Young Adults." It will focus on qualitative and quantitative web based assessment and intervention to help young adults avoid excessive weight gain by increasing their intake fruits and vegetables and increasing their physical activity. As in the past, the outcomes of their previous work will be applied in this new project.

NEW DIRECTIONS

Over the past few years, CSREES has engaged in several new activities which it anticipates will continue. For example, three national meetings focused on obesity have been held. At each of these meetings the Nutrition team has sought recommendations on the future direction of the program. Based on input received, it is planned that NRI section 31.5 “Human Nutrition and Obesity” will continue to focus on the behavioral aspects of obesity prevention and not medical treatment. CSREES will require all projects, except for those involving epidemiological research, be integrated. It will also require all projects to in some way address food. Because of health disparities among population subgroups, especially those who are economically disadvantaged, projects that focus on high risk groups will continue to be of interest. To strengthen the field devoted to addressing nutrition education and behavior issues and to shed light on areas needing further research, the Nutrition team plans to continue bringing grantees together on an annual basis to present their progress. Because of the large number of high quality proposals received and the Agency’s limited budget, CSREES may consider further focusing of the program, but it is difficult to decide what should be eliminated. In addition, the Agency is very interested in helping to establish one or more multistate research/extension projects focused on obesity. Work on one in the Western region has begun. The Nutrition team also wants to continue to work closely with other Federal agencies who are working on obesity prevention. Several nutrition coordinating committees within USDA and with HHS are in place to foster communication and collaboration. For example, the Office of Science and Technology Policy (OSTP) recently formed an interagency Working Group on Obesity and Overweight to improve coordination of Federal research activities in this area. The Working Group is co-chaired by USDA’s Deputy Undersecretary for Research, Education and Economics, and includes members from CSREES and ARS.

COOPERATIVE EXTENSION SYSTEM – NUTRITION AND HEALTH

Program efforts in this area are primarily delineated in the CRIS Knowledge Area 703: Nutrition Education and Behavior. This work includes research, education, and integrated projects but is primarily involved in the development and evaluation of community-based nutrition education programs for the general population. Additionally, the Cooperative Extension System (CES) holds forums that educate citizens/consumers on public policy. These public policy education programs are an integral component of the community's public policy issues related directly to food affordability and accessibility.

Nutrition and Health is the title given to the community-based nutrition education programs carried out at the State and County levels by CES in partnership with Cooperative State Research, Education, and Extension Service (CSREES). This program effort is also known as the Base Program because it is an ongoing priority program that serves consumers at all socioeconomic levels. The primary purpose of this program is to educate consumers in making appropriate choices relative to their nutrition, diet, and health status. There are several program efforts that constitute the Nutrition and Health Base Program: Dietary Guidance, Food Biosecurity, and Health. Health program efforts are limited to health issues that have a major nutrition component related to prevention and treatment of a disease entity, e.g., Diabetes Mellitus. Most of the nutrition education programs offered at the local or county level by CES use the Dietary Guidelines for Americans as topics for planned, non-formal nutrition education series for adults and youth. There are also programs targeted towards pregnant women and their children, including infants, and the elderly, focusing on nutritional needs.

CSREES is constantly scanning the scientific literature and being vigilant to determine what health and nutrition issues might emerge. One of the most significant recent health issues was the increasing rate of overweight in children, especially in minority children. There has been a dramatic increase among all children, regardless of age, gender, and race. However, the increase in obesity for African American and Hispanic children is especially disturbing. Obesity, among these children increased by 120 percent, compared to 50 percent among white children. (See Evidentiary Material)

The Centers for Disease Control and Prevention (CDC) estimated that 16 percent of children and adolescents ages 6-19 years were overweight. These data for adolescents are of great concern because overweight adolescents are at increased risk of becoming overweight adults. Additionally, CDC estimated that 65 percent of all adults are overweight and about 30 percent are obese. Overweight and obesity often are risk factors for four of the leading causes of death in this country: coronary heart disease, type 2 diabetes, stroke, and cancer;

Because of the public's need to tackle the significant public health issue of overweight and obesity, CSREES, in partnership with CES, actively worked with a number of community entities, including other government departments, agencies, and nonprofit organizations to lower the prevalence of childhood obesity by approving the planning and implementing of a National Initiative, *Reversing Childhood Obesity Trends: Helping Children Achieve Healthy Weights*. A National Initiative represents CES' commitment to respond to important societal issues of broad national concern and significantly increased efforts to achieve a major impact on these national priorities.

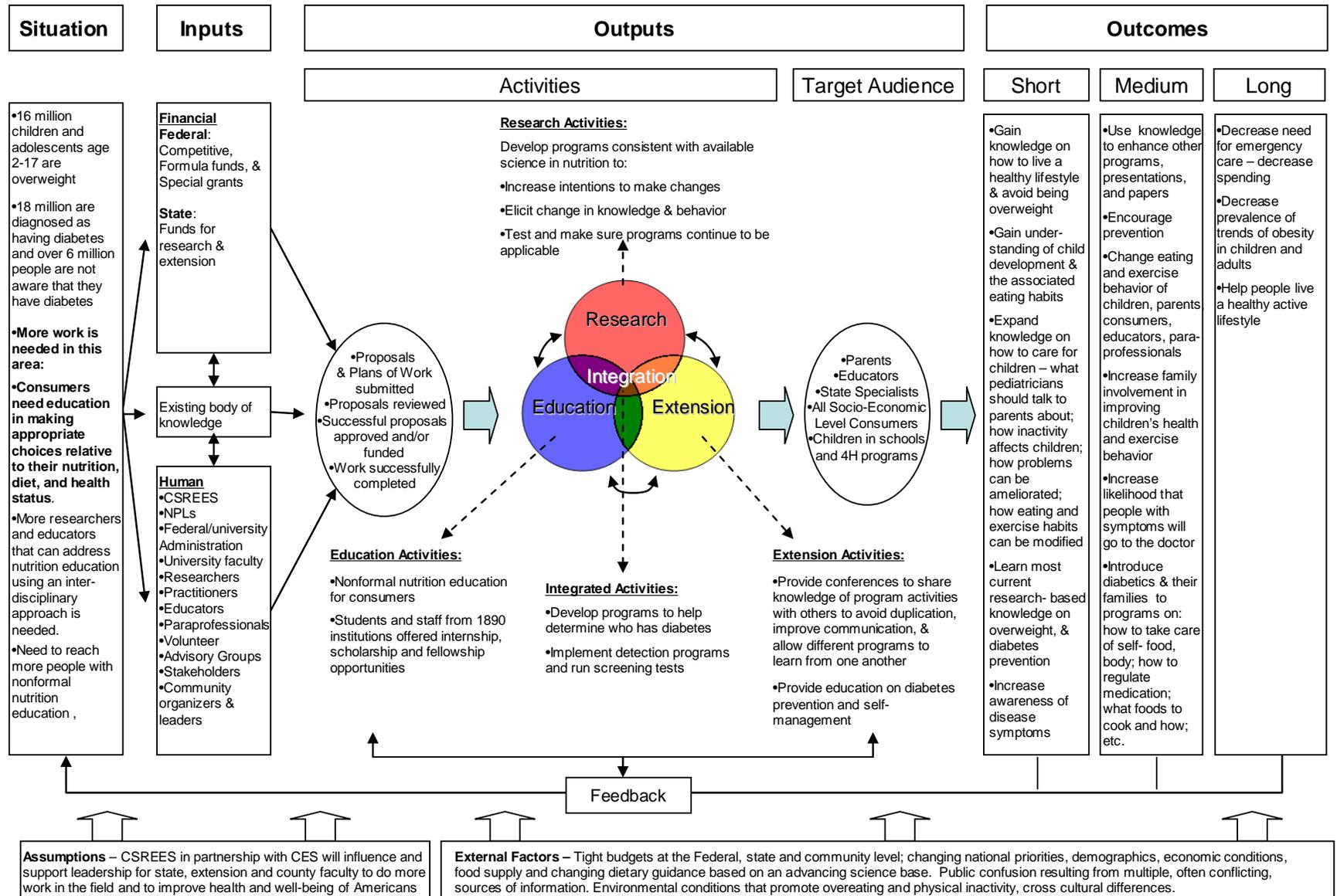
Another major health condition is Diabetes Mellitus, especially type 2 diabetes. The *National Institute of Diabetes and Digestive and Kidney Diseases* (NIDDK) estimated that 18.2 million people have been diagnosed with diabetes while 6.2 million people are undiagnosed. To tackle this massive public health problem, CSREES, in partnership with CES, joined with the Joslin Diabetes Center, in Boston, Massachusetts, an affiliate of Harvard Medical School, a major center for the study of diabetes, to provide the public with diabetes awareness, preventive education, and screening. The Diabetes Detection and Prevention Projects were the

result of this collaboration between the Joslin Diabetes Center and CES. These projects have been very successful in screening and educating the public of the dire consequences of not detecting diabetes mellitus.

Another important aspect of the Nutrition and Health Base Program is the CES's work with other community organizations in a collaborate effort to eliminate hunger and food insecurity. The rising level of hunger and poverty in our country prompted the need for CES to hold public forums and educate citizens/consumers in public policy and train staff and volunteers who work directly with families and individuals in need of assistance, e.g., evacuees from natural disasters. This effort is carried out mainly by helping to delineate the community's public policy issues related to food affordability and accessibility. CSREES supported this program by publishing a guide of the Nation's food recovery programs (*A Citizen's Guide to Food Recovery*) that was shared with other community organizations. CSREES also provided a listserv monitored by the Base Program National Program Leader that aided CES State and County staffs to network and strategize regarding innovative ways to provide a public service activity and assist emergency feeding organizations with their food recovery programs. Primarily, CES assisted the community organizations through the training of staff and volunteers in food handling and safety guidelines. (See Evidentiary Material)

The next figure is the CES logic model for Healthier Food Choices and Lifestyles. It highlights the outputs and outcomes of the program and attempts to show graphically how these pieces operate together to improve the situation.

Portfolio 4.2 – Promote Healthier Food Choices and Lifestyles: Cooperative Extension System – (CES)



INPUTS

The Nutrition and Health Base Program is funded through Smith Lever formula funds. Below is a table indicating an estimate of funds used for nutrition in the states; however, no additional funds were provided for the CSREES/CES Childhood Obesity Initiative.

Table 18

UNITED STATES DEPARTMENT OF AGRICULTURE*									
Nutrition Education									
(Dollars in Thousands)									
<u>Category/Agency</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2006</u>	<u>2006</u>
	<u>Actual</u>	<u>Actual</u>	<u>Actual</u>	<u>Actual</u>	<u>Actual</u>	<u>Estimate</u>	<u>Budget</u>	<u>House</u>	<u>Senate</u>
COOPERATIVE STATE RESEARCH, EDUCATION, AND EXTENSION SERVICE, SELECTED PROGRAMS ONLY									
CSREES-Extension Activities:									
Extension (Formula est.).....	16,600	16,600	16,600	16,804	16,700	16,625	16,978	16,977	16,625
1890's and Tuskegee.....	1,654	1,695	1,876	1,920	1,909	1,978	2,086	2,046	2,044
Total.....	<u>18,254</u>	<u>18,295</u>	<u>18,476</u>	<u>18,724</u>	<u>18,609</u>	<u>18,603</u>	<u>19,064</u>	<u>19,023</u>	<u>18,669</u>

*These data are based upon an estimate of approximately 6.016% of 1862 Smith Lever 3b&c funds supporting human nutrition work. It is assumed that it is the same percentage for the 1890's; however, the percentage might be low for the 1890's.

OUTPUTS

Research

Research conducted by CES Faculty and the State Experiment Stations support the community-based nutrition education programs. A number of research projects focused on obesity prevention, food insecurity, and diabetes detection and prevention. The Diabetes Detection and Prevention Projects are collaborative efforts of the Joslin Diabetes Center and the Cooperative Extension programs at Washington State University, University of Hawaii-Hilo, New Mexico State University, and the University of West Virginia. These Projects are designed to leverage the respective technical expertise and resources of (1) the Joslin Diabetes Center, and (2) the CES's state and county faculty, for enhanced diabetes awareness and improved diabetes self-management. These projects are focused on both Type 1 and Type 2 Diabetes. Type 2 Diabetes is found more frequently in the population mainly due to overweight and obesity; consequently, efforts to reduce the prevalence of overweight and obesity are an integral component of these projects.

There is some evidence that food insecurity is part of a complex set of causes for overweight and obesity in limited resource families. Therefore several Hatch Projects are looking into the role food insecurity plays in overweight and obesity in limited resource families. (See Evidentiary Material)

Extension

As part of its mission, the Cooperative Extension System (CES) delivers nutrition education programs to the general public at all socioeconomic levels, promoting healthy eating patterns and physically active lifestyles. The basis for most of these program efforts is found in the Dietary Guidelines for Americans and the Food Guide Pyramid (MyPyramid 2005). These program efforts also meet the performance guidelines related to Cooperative State Research, Education, and Extension Service's (CSREES) *Strategic Goal 4: Improve the Nation's Nutrition and Health*. CSREES, in partnership with CES, has actively worked with a number of community entities, including government departments, agencies, and nonprofit organizations to lower the prevalence of childhood obesity.

One of the most significant ways that CES and CSREES became involved in reversing the trends of childhood and adolescent obesity was to approve the planning and implementation of a National Initiative in the early 2000s. The Program Leadership Committee, a Subcommittee of the Extension Committee on Organization and Policy, approved the National Initiative: *Reversing Childhood Obesity Trends: Helping Children Achieve Healthy Weights* (RCOT). The Initiative protocol describes a conceptual framework developed for CES state and county faculty. The program guidelines established a set of goals and strategies focused on childhood obesity for state and county faculty. This community-based program integrates Extension, Research, and Education.

Considering that overweight and obesity are high risk for Type 2 diabetes, CSREES, in partnership with CES, began community-based nutrition education programs for the general public. In order to offer a more comprehensive program, CES joined with the Joslin Diabetes Center, in Boston, Massachusetts, Harvard Medical School to improve diabetes awareness and self-management. The Diabetes Detection and Prevention Projects integrate both Extension and Research. Below is a table delineating the Special Grant Funding for these Projects.

Table 19: Diabetes Detection and Prevention Projects Funding

YEAR	FUNDING AMOUNT
FY 1999	\$ 550,000
FY 2000	\$ 550,000
FY 2001	\$ 923,963
FY 2002	\$ 906,000
FY 2003	\$ 917,994
FY 2004	\$ 1,089,534
FY 2005	\$ 1,084,256
FY 2006	\$ 1,093,000

Not only is there a health consequence for individuals with undiagnosed diabetes, but the financial cost of the disease is also great. It is estimated that the direct and indirect costs attributable to diabetes in adults was \$132 billion in 2002. The stated cost probably underestimates the true burden of diabetes because it omits intangibles of the care needed for individuals suffering from diabetes. These health care costs are extremely high for a chronic disease that, if well managed by the individual, would significantly reduce the cost of medical

care and hospital stays. These data were based on a study conducted by the Lewin Group, Incorporated, for the American Diabetes Association and are 2002 estimates of both the direct costs (cost of medical care and services) and indirect costs (costs of short-term and permanent disability and of premature death) attributable to diabetes. (See Evidentiary Material)

Education

Graduate and undergraduate education activities are covered in this report in the Higher Education Theme Area. One area that was not mentioned was CSREES mentoring of 1890 Scholars, who are undergraduates students attending 1890 universities. These students can work during the summer for an USDA Agency to gain experiential skills during undergraduate years. Another innovative program is the 1890 Fellows Program. The Fellows Program offers the opportunity for experience at the Federal level for young 1890 Faculty and Extension Staff. This program also offers mentoring for the Fellow while at CSREES and after they return to their university. The National Program Leaders, in the area of Nutrition, act as preceptors and mentors during 1890 Scholars' and 1890 Fellows' educational experience in Nutrition and related fields. Two 1890 Fellows and one 1890 Scholars worked with the NPL for Nutrition and Health Base Program.

Integrated Programs

The CES faculty are participating more frequently in Integrated Research Projects, including some in the area of overweight and obesity. These projects were funded primarily through a formal funding mechanism that required competitive grant applications to be integrated. This funding stream began with the Initiative for Future Agricultural and Food Systems (IFAFS), which was funded in 2000 and 2001, and was targeted to obesity prevention. Starting in 2003, a section within the NRI was established for competitive, integrated grants focused on obesity prevention. During this time, several projects were funded where CES faculty were partners with Research Faculty when submitting proposals to NRI for obesity prevention.

OUTCOMES

Findings from Research, Extension, Education, and Integrated Projects are disseminated by various means, such as publications, presentations, media reports. Additionally, Extension professionals disseminated research findings to lay audiences in newsletters, radio, television programs, and via the internet.

Short Term

The findings from the sources mentioned above, expand knowledge of the factors that influence diet quality, physical activity, food security, food safety, food resource management, sustainable food systems, as well as, any barriers to change. Research and practice expand knowledge of the characteristics of effective educational interventions. Research sheds light on effective methods and measures for evaluating successful interventions. As a result of the educational interventions that are developed, we expect that program participants will gain knowledge and skills. College students who benefit from high quality course work and experience will gain knowledge related to community nutrition.

Medium Term

Based on the short term outcomes, more effective educational interventions are developed by practitioners. Effective interventions are identified using evaluation strategies. Based on the non-formal education they receive, we expect program participants will improve their diets and diet-related behaviors. The numbers of qualified researchers and practitioners are increased because of

the high quality of their education. Based on findings from research and practice, community leaders and policy makers introduce changes that foster healthy diets, physical activity, and improve food security and sustainability.

Long Term

Consumers will sustain improvements in health resulting from improvements in diet quality, physical activity, and sustainable food systems. The programs/projects also explore new opportunities for the Cooperative Extension System to address health disparities, such as diabetes, obesity, and cardiovascular disease among selected high risk minority populations and others.

SPECIFIC EXAMPLES

- 1) The Diabetes Detection and Prevention Projects (DDPP) are collaborative efforts of The Joslin Diabetes Center, and the CES programs at Washington State University, University of Hawaii-Hilo, New Mexico State University, and the University of West Virginia. These projects are designated to leverage the respective technical expertise and resources of (1) the Joslin Diabetes Center, a major center for the study of diabetes, and (2) the CES’ State and County faculty. Additionally, these projects provide a forum for CES’s demonstrated delivery of timely science-based information and culturally appropriate educational programs that improve individual, family, and community well-being. The following table delineates the participants reached by the DDPP for 2004:

Table 20
Total Numbers of Participants Reached With the “On the Road” Program, 2004

State:	Baseline	Follow Up	Total
Hawaii	375	330	705
Washington	1700	1400	3100
New Mexico	800	650	1450
West Virginia	350	130	480
TOTAL	3225	2510	5735

- a) **Short Term:** The Diabetes Detection and Prevention Projects’ findings expand participants’ knowledge regarding the influence that diet quality and physical activity have on the prognosis of type 2 diabetes. Research and practice expand knowledge of the characteristics of effective educational interventions. Research sheds light on effective methods and measures for evaluating successful interventions. As a result of the educational interventions that are developed, we expect program participants will gain knowledge and skills that will enhance their disease prognosis.
- b) **Medium Term:** Based on the short term outcomes, more effective educational interventions are developed by practitioners. Effective interventions are identified using

evaluation strategies. Based on the non-formal education they receive, we expect program participants will improve their diets and diet-related behaviors.

- c) **Long Term:** The participants of the Diabetes Detection and Prevention Projects will sustain improvements in health resulting from improvements in diet quality and physical activity. The participants will become better able to manage their diabetes leading to an improved disease prognosis. The projects also explore new opportunities for CES to address health disparities, such as diabetes, among selected high risk minority populations.

2) **Diabetes Awareness, Education and Screening Project** **Supported by USDA CSREES, Awards 99-EXCA-2-1020 and 2004-45043-03043**

The purpose of this project was to educate individuals about the five tests that can be used to check a person's diabetes. When people with diabetes regularly have these tests, they know when to take action to prevent or delay complications associated with diabetes. Adults diagnosed with diabetes were recruited to participate in this educational research project to prevent the complications of diabetes. Participants attended a 2-hour group session where they completed a questionnaire, were screened for hemoglobin A1c, LDL cholesterol, microalbumin and blood pressure, and participated in an informational session. After three months, participants completed an evaluation questionnaire and had the opportunity to have their A1c re-checked.

During the course of this project, over 550 adults were enrolled on the islands of Hawaii and Molokai. The adults with diabetes learned about the five medical tests and were screened for four of these tests. Ninety percent of the participants completed the follow-up evaluation questionnaire after three months, with most gaining knowledge about diabetes and the five tests, and reported seeing their health care provider, eating better, and exercising more regularly as part of their efforts to manage and control their diabetes (to potentially delay or prevent diabetes-related complications). Most of the participants who rechecked their A1c had levels that had improved or remained the same since their enrollment.

- a) **Short Term:** This study provides the knowledge needed to educate adults about the five tests that can be used to check a person's diabetes. 550 individuals were enrolled in the study on the islands of Hawaii and Molokai. When people with diabetes regularly have these tests, they know when to take action to prevent or delay the complications associated with diabetes. Research sheds light on effective methods and measures for evaluating successful interventions. As a result of the educational interventions that are developed, program participants gain knowledge and skills. College students who benefit from high quality course work and experience gain knowledge related to community nutrition.
- b) **Medium Term:** Based on the short term outcomes, ninety percent of the participants completed the follow-up evaluation questionnaire three months, after the educational group session was completed, most participants reported that they had gained knowledge about diabetes and the five tests that can be used to check a person's diabetes, seeing their health care provider, eating better, and exercising more regularly as part of their efforts to manage and control their diabetes. Based on the non-formal education they

received, we expect program participants will improve their diets and diet-related behaviors.

- c) **Long Term:** The results from this project reveal that participants will potentially delay or prevent diabetes-related complications. This intervention can be replicated by a consortium of government, community, and educational institutions to help allay the consequences of diabetes complications.

SUCCESS STORIES

In 2001, CSREES, in partnership with CES, initiated a new National Initiative: *Reversing Childhood Obesity Trends: Helping Children Achieve Healthy Weights*. The National Leadership Management Team (NLMT) conducted a Needs Assessment Survey to elicit stakeholder input. The methodology used was Focused Dialogue Teleconference (FDT) calls. Focused Dialogue is a methodology similar to Focus Group Interviews except the discussions takes place via teleconference calls. The purpose of the FDT calls was to determine which programming areas might best support program/project strategies at state and county levels. More than forty state and territorial contacts participated in these teleconference discussions.

Results: The NLMT pairs presented their summaries of the FDT at a meeting in Washington, DC in 2001. In general, the FDTs revealed that only one state, California, had specific programs and activities focused on the prevention of childhood overweight. Most states had general nutrition education programs and materials promoting a balanced diet based on the Food Guidance System and the U.S. Dietary Guidelines aimed at families and individuals. Some nutrition faculty also promoted physical activity to balance calorie consumption. Based on the results of the Needs Assessment, the Team determined that the following tasks would be their priority list:

- **Provide:** In-Service Training for Nutrition Specialists and County Nutrition Professionals;
- **Rationale:** While Nutrition Specialists and County staff have existing programs and collaborations, it is important that they also have the reinforcement from the National level needed to address the problem of childhood obesity.

- **Develop:** A Family Centered Intervention for Parents of Young Children to Prevent the Onset of Obesity;
- **Rationale:** Prevention of childhood overweight and obesity means a lifestyle change that begins early in life and must include the entire family to be successful.

- **Develop:** A Longitudinal Research Project; Design and Evaluate An Intervention for Minority Children at High Risk of Type 2 Diabetes;
- **Rationale:** Type 2 Diabetes is increasing at alarming rates, particularly among minority children who are overweight. Research is needed to develop, implement, and evaluate different interventions to assist in reversing the trends of childhood overweight and obesity.

- **Provide:** Each State/Territory with a resource tool kit: *Children and Weight: What Communities Can Do*;
- **Rationale:** The prevention of childhood obesity requires an integrated approach. Coalitions and networks can help communities create environments that support

enjoyable, healthful eating, physical activity, and a positive self-image among children and adults.

- **Develop** a Distance Education Course Designed for state and county faculty but that could be used by other Health Professionals;
- **Rationale:** The prevention of childhood obesity requires that State and County staffs have access to timely accurate research-based information about the prevention of pediatric overweight.

In 2004, a survey was sent to the state and territory contacts to elicit the progress made by the National Leadership Management Team in reaching the goals of the Project. Following are the accomplishments of the RCOT Project: (See Evidentiary Material)

1) **Provided In-Service Training for Nutrition Specialists and County Nutrition Professionals** During the FTD with state contacts, it became clear that many states were having budgetary problems. As a result, most state contacts did not have funds to travel to a National Conference. The Leadership Management Team disseminated information about childhood overweight through the following venues:

- a) Publication of a Electronic Quarterly Newsletter
Links to the newsletters appear on our project's webpage. Of the 34 respondents to the survey, seventy-six (76%) percent of the State Contacts (N=24) reported that they received the newsletter and shared it with others in their state such as other state specialists, county staff, faculty in their department, and other state agencies.
- b) Establishment of a Project Website on the Center for Weight and Health Website; and
- c) Distribution of a Resource Kit, "Children and Weight; What Communities Can Do". As a result of National Leadership Management Team's efforts, **67 percent** of state contacts responded they have provided in-service training for their county staff on pediatric overweight. None had provided this training before the inception of the National Project.

2) **Development of A Family Centered Resource for Parents of Young Children to Prevent the Onset of Obesity**

This Family Centered Resource is constructed around raising healthy preschoolers in safe, secure and nurturing families. Facilitated dialogues will be used to help families realize that they need to make choices (e.g., food and activity selections) and engage in behaviors (e.g., eating family meals and engaging in active play) that will link their basic values to their lifestyle practices.

3) **Development of a website and list serv for this Project through the Center for Weight and Health at UC Berkeley** <http://www.CNR.Berkeley.EDU/cwh/activities/trends.shtml>

The Center for Weight and Health at UC Berkeley offered to display information about this project via their website. Current information available includes the vision, mission, goals, strategies, contact information on National Leadership Management Team and state contacts, as well as a link to the newsletters. In addition, the Center website contains a plethora of information on childhood overweight, including an extensive review (130 pp) of the scientific literature as well as descriptions of numerous resources. Respondents to the survey revealed

that 88 percent of the state contacts have made use of the project and Center website. When asked to rate the helpfulness of the website on a 5 point scale with 5 representing “very helpful,” contacts gave the website a high 4.5 rating.

4) **Longitudinal Research Project – Design and Evaluate an Intervention for Minority Children at High Risk of Type 2 Diabetes**

The following project was supported by the National Leadership Management Team and received funding through USDA/CSREES:

Randomized, Controlled Community Intervention to Reduce the Risk of Type 2 Diabetes in Overweight African American Children:

**PI’s: Sharon Fleming, PhD and Joanne P. Ikeda, MA, RD
Co-Directors, Center for Weight and Health, UC Berkeley
USDA/CSREES Grant, \$1M, notified of award 11/20/03**

Abstract

The prevalence of pediatric type 2 diabetes has risen at an unprecedented rate. Prevention strategies that target high risk children are urgently needed to address this public health crisis., can be easily replicated, are sustainable, and can be used to inform food aid programs, and community and school organizations traditionally involved in the health and welfare of children. The goal of the proposed project is to reduce risk of type 2 diabetes in overweight 9-10-year old African American children through a community-based program that includes research, extension and education components. (See Evidentiary Material)

NATIONAL LEVEL CONFERENCES

Another example of CSREES working in partnership with CES is the planning and implementation of the **2002 and 2004 National Nutrition, Food Safety, and Health Conferences**. These Nutrition Conferences were the result of the National Program Leader for Nutrition and Health and the State Planning Committee’s coordinated efforts to improve communication and provide new insight into Federal program policies and accountability issues in light of recent developments in legislation (e.g., new guidelines for State Plans of Work and the accompanying increased need to illustrate program accountability). Another significant aspect of the Conference was the discussion of emerging nutrition, food safety, and health issues with leaders in the field. Four of the main conference objectives were to:

- Address accountability issues at the Federal, State, and local levels;
- Strategize and network around critical and emerging issues in nutrition, food safety, and health;
- Investigate funding sources for nutrition, health, and food safety, research, and programming;
- Explore innovative ways of integrating Extension, Research, and Education programming.

The Nutrition Conferences were found to be successful in terms of participant satisfaction. The participants stated that the Nutrition Conferences provided a forum for discussion of issues such as state program innovations, various changes in Federal polices, and science-based information relative to new knowledge or research . The participants rated both the plenary and interactive concurrent sessions at the highest levels as being **Very Informative or Informative**. (See Evidentiary Material)

NEW DIRECTIONS

Future Directions will include developing and implementing the following projects:

Reversing Childhood Obesity Trends: Helping Children Achieve Healthy Weights:

NPL and National Leadership Management Team (NLMT) will continue to provide leadership to the childhood obesity program/project, *Reversing Childhood Obesity Trends: Helping Children Achieve Healthy Weights*. The National Leadership Management Team (NLMT) has not had funding for any of the projects or accomplishments that the National Initiative has undertaken. There is a great need for funding and support for this program since it represents both Extension and Research. The LMT has written a proposal for funding to be submitted to several funding streams to implement the development of a Distance Education WEB-CT course focused on healthy weights for children and adolescents.

NPL and National Leadership Management Team (NLMT) will conduct a pilot test and implement the Family Centered Resource Kit. As mentioned earlier, the Kit is constructed around raising healthy preschoolers in a safe, secure, and nurturing family. Facilitated dialogues will be used to help families realize that they need to make choices for the health and well being of their children. The NLMT will seek funds for the pilot testing, training the trainer, and evaluating the effectiveness of the intervention.

1890 Childhood Obesity Prevention Project Development

NPL will work closely with several 1890, Historically Black Land Grant Universities, faculty, and staff to conduct a collaborative project that focuses on childhood obesity in minority communities. The team of 1890 faculty has developed a draft proposal to submit for funding. Data for youth from NHANES III showed a similar pattern to that seen among ethnic adults in terms of racial and ethnic health disparities. For example, Mexican American boys tended to have a higher prevalence of overweight than non-Hispanic black and non-Hispanic white boys. Non-Hispanic African American girls tended to have a higher prevalence of overweight compared to non-Hispanic white and Mexican American girls. These data prompted the research and extension faculty to focus on the caregiver's feeding practices of racial and ethnic preschool children.

Diabetes Detection and Prevention Projects

The Diabetes Detection and Prevention Projects explore new opportunities for CES to address health disparities, such as diabetes, among selected high risk minority populations. Although these projects are funded by a Special Grant, the need to assess the value of the interventions of the respective states is significant. Consistent impact indicators will be developed for the six states receiving the Special Grants so that an evaluation plan can be put in place to assess the benefit of the interventions.

Future Directions in the Nutrition and Health Base Program will also include a planning with other CES and CSREES Nutrition Program Evaluation efforts (e.g. EFNET and FSNE) to assist state and county faculty to document the effectiveness of their community-based nutrition and health programs for the general public. There is an increasing need for National and State documentation and accountability of program effectiveness which can be aggregated nationwide. Nutrition and health outcomes are especially difficult to quantify on a short-term basis. Therefore, joint efforts are necessary to complete this significant aspect of program activity.

The timeline for this project would be one year. It is anticipated that the Task Force would report on their work at the National Nutrition, Food Safety, and Health Conference, 2007 (Conference

similar to the one held in Baltimore). There will be a publication describing the procedures, methods, and consensus model used to arrive at the impact indicators.

EVIDENTIARY MATERIALS

I. CRIS Projects-Food Insecurity

Diabetes Detection and Prevention Projects (2003-2005)
Hunger, Food Security and Obesity: A Paradox Emerges (2004)
The Relationship of Poverty, Food Security, and Food Assistance to Child (2004)

II. Food Security

Safe Food For The Hungry (2005 Newsletter)
A Citizen's Guide to Food Recovery

III. Nutrition and Health

Article: A New You-Health For Every Body Eat Well for Less-Online Learning Tool (2001)
Nutrition, Diet, and Health Base Program Strategic Team (12/2001)
Maximizing Brief Encounters
Nutrition and Health Brochures
Making New Foods Fun For Kids

IV. Childhood Obesity

Reversing Childhood Obesity Trends: Helping Children Achieve Healthy Weights:
Program/Project Guidelines
If My Child Is Overweight, What Should I Do about It? (Publication, rev. 2004)
Reversing Childhood Obesity Trends: Helping Children Achieve Healthy Weights- A
Progress Report (2004).

V. Nutrition Conferences

National Nutrition, Food Safety, and Health Specialists' Conference (March 29 –March 31,
2001)
Nutrition, Food Safety and Health (March 29-April 1, 2005)

VI. Diabetes Detection and Prevention Projects (DDPP)

Presentations (2002-2004)
Bridging the Gap with Education: Diabetes Symposium and Workshop (Article and Abstract,
2000-2004)
Enhancing "A1c Awareness" in Patients with Diabetes (Glycemic Improvement 2004)
Community Base Program to Encourage Patients' Attention to their Own Diabetes Care
(Sept/Oct. 2005)
Dining with Diabetes/On the road to living well with Diabetes Program goals (2004)
Dining with Diabetes (pamphlet, articles, questionnaire session 1, 2, and 5, and sample
summary report, 2004)
Diversifying, Sustaining, Strengthening-Impact Report (2004)
Diabetes Awareness, Education and Screening Project (2004)
Living Well with Diabetes (Lesson notebook 2-5)

V. Cooperate Extension Service (CES) Diabetes

Evaluating the Effectiveness of an Extension-based Diabetes Education

Program on Lifestyle Behaviors and Blood Glucose Control in Persons with Type 2 Diabetes (article)
The Healthy Diabetes Plate (pamphlet)
Plate Method Menu Ideas (pamphlet)
Cocinando para Grupos (booklet)

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EXPANDED FOOD AND NUTRITION EDUCATION PROGRAM (EFNEP)

The USDA's Cooperative State Research, Education, and Extension Service's (CSREES) Expanded Food and Nutrition Education Program (EFNEP) is a unique program that began in 1969 and is designed to reach limited resource audiences – especially youth and families with young children. EFNEP operates in partnership with the Cooperative Extension System in all 50 states and in American Samoa, Guam, Micronesia, Northern Marianas, Puerto Rico, and the Virgin Islands. Extension professionals train and supervise paraprofessionals and volunteers who teach food and nutrition information and skills to limited resources families and youth.

EFNEP provides a comprehensive, integrated, experiential education program of about 10 – 12 lessons that addresses four core areas, diet quality, physical activity, food safety and food resource management (which includes food shopping and food security) to assist low-income youth and families in acquiring the knowledge, skills and changed behavior necessary for nutritionally sound diets and improvement of the total family diet and nutritional well-being. EFNEP programs across the country measure participant's nutrition-related behavior at program entry and exit on common instruments and report the data to USDA through a common reporting system, called the Evaluation/Reporting System, version 4 (ERS4).

EFNEP is a program that achieves behavior change in its clients. One key to its success is the experiential model that allows participants to gain a new skill during the education process, go home and practice this skill, and then come back for the next lesson where the new behavior is reinforced. By making small changes, and gaining success with these changes, participants are motivated and encouraged to continue learning and adopting recommended behaviors. As a result of the multi-lesson series, participants are able to make sustained behavior change. The focus can shift from year to year or from one target audience to another to be highly responsive to multiple national priority topics.

INPUTS

Financial

Table 21 shows the Federal funding for EFNEP.

Fiscal Year	2000	2001	2002	2003	2004
Appropriation	\$58,695,000	58,565,871	58,566,000	58,185,321	52,057,041
Payment to States	\$58,547,880	58,423,916	58,424,040	58,058,588	52,057,041

The funding for EFNEP has been nearly level since 1982, when the appropriation was \$60,354,000. It has varied between \$57,635,000 and \$61,431,000 during these years. The low point in 2004 was unexpected, as there had been a requested increase in the President's budget submission and both the House and Senate Appropriations committees were in agreement to keep the funding at the FY 2003 level. However, as the final budgetary negotiations were underway, the allowable target for funding in Agriculture was exceeded, and a last minute compromise resulted in all targeted Extension programs (covered in Smith-Lever 3(d) funding) being cut by over 11%. In 2005, these funds were restored for EFNEP.

Funding for EFNEP is somewhat unique because the program has its own authorizing legislation, Section 1425 of the National Agricultural Research, Extension and Teaching Policy Act. This

Act specifies the intended target audience, the focus of the educational intervention, the delivery mode and most specifically, the funding allocation. The funds are distributed based on a formula that is largely driven by the proportion of low income residents in a state or territory. In the table above, the difference between the Appropriation and the Payment to States represents the Federal administrative share of the funds. As you can see in Table 21, the Federal administrative share of the funds is quite low, and in 2004 there were no funds retained at CSREES from the Appropriation.

EFNEP does not require matching funds, but many states choose to add resources to the Federal allocation because they recognize the value of this program. The funds may come from state, county or non-tax dollars. To illustrate the added resources provided from other sources, the following table (Table 22) lists the total funds from grants, contributions and other sources for each fiscal year. Some of the variation from year to year in the reported amounts is a reflection of missing data (states are encouraged, but not required to provide this data and may not consistently require reports from their counties). In FY 2002, one state, (CA), reported a very large contribution and in FY 2003, New York reported a very large increase in "other dollars". Our reports do not provide any of the documentation about the source of these supplemental funds.

Table 22: Supplemental funds to support EFNEP at the state and county level

Year	2000	2001	2002	2003	2004	Total
Grant Dollars	\$ 1,958,224	\$2,188,173	\$ 2,238,636	\$ 1,120,448	\$2,141,390	\$ 9,646,871
Contribution Dollars	\$ 3,381,880	\$1,603,422	\$16,234,121	\$ 2,050,665	\$1,766,878	\$25,036,966
Other Dollars	\$ 6,314,371	\$1,883,332	\$ 1,762,301	\$37,519,726	\$2,363,482	\$49,843,212
Total	\$11,654,475	\$5,674,927	\$20,235,058	\$40,690,839	\$6,271,750	\$84,527,049

Existing Body of Knowledge

EFNEP has a long history of effectively reaching limited resource families and youth and helping them to make sustained behavior changes related to food practices and dietary quality. Over the years, EFNEP has added to the body of nutrition education research through studies on long-term impact, new evaluation strategies, learning styles and new curricula as well as on how to recruit and train paraprofessionals and volunteers. A listing of key research articles demonstrates the areas of study and the reach and breadth of the program [see list at end of document section].

As with all nutrition education programs funded by USDA, states use the Dietary Guidelines, Food Guide Pyramid and Nutrition Labeling regulations as a basis for the educational content of the lessons. For the food safety component, the recommendations of the Food Safety and Inspection Service and the Food and Drug Administration also are followed. Where appropriate, other key nutrition documents, such as the Healthy People 2010 Health Objectives for the Nation, the Recommended Dietary Allowances from the National Academy of Sciences and similar documents are used.

Human Inputs

EFNEP is primarily taught by paraprofessionals and volunteers who are recruited and trained by county and state nutrition specialists and staff. The paraprofessionals are hired from the communities in which they work and they serve as role models for the clients reached.

Table 23: Number of paraprofessionals and volunteers that support EFNEP

Year	# of Paraprofessional	Paraprofessional FTEs	Volunteers	Volunteer FTEs
00	2,540	1,231.5	36,911	288.30
01	2,448	1,177.6	37,419	266.20
02	2,300	1,122.3	34,941	237.30
03	2,181	1,056.8	33,435	222.60
04	2,164	1,006.5	32,295	238.90
Totals	11,633	5,594.7	175,001	1,253.30

The value of the volunteer hours worked has been computed by the INDEPENDENT SECTOR to be \$17.55 per hour. The computations for FTE assume 2088 work hours equals 1 FTE. Thus for FY 2004, the dollar value of volunteer support for EFNEP was over \$87 million. [Source: http://www.independentsector.org/media/20050324_time_value.html].

Partnerships and collaborations within communities are also critical to the success and reach of EFNEP. Data on Interagency Cooperation lists the number of agreements and coalitions that occur throughout the nation.

Table 24. Agreements and Coalitions that expand the reach and effectiveness of EFNEP

Year	00	01	02	03	04	Total
Number of Agreements	5,998	5,987	5,991	6,141	6,203	30,320
Number of Coalitions	1,514	1,476	1,550	1,399	1,267	7,206
Total	7,512	7,463	7,541	7,540	7,470	37,526

OUTPUTS

Research

The delivery modes, curricula and other program components are research based. (see listing for specific references).

For example, a series of studies on the use of a goal-oriented intervention for adolescents has found this technique to be highly effective in challenging adolescents to improve their eating and fitness choices and this has been adopted in education efforts. [See EatFit references from CA in the evidentiary materials.]

Similarly, a series of studies has been conducted using theoretical models including stages of change and interactive media dietary assessment tools to improve the reach and impact of nutrition education for low income Hispanic participants receiving the La Cocina Saludable curriculum [see La Cocina Saludable and Interactive Media Dietary Assessment references from CO in the evidentiary material].

Additional efforts have contributed to overall evaluation and program strengthening. For example, Iowa developed a “Guide to Evaluating Written Nutrition Education Materials” to have some consistency in what characteristics should be included when deciding what materials to use. A pictorial set of food photos was also developed as an aid in collecting accurate food recall data [see IA references]. California has also studied the utility of adding photos to the behavior checklist survey as an aid in reaching low literacy audiences, who may also speak many different languages. This improves the participants' comprehension of what the question is about [See CA references on food behavior checklist].

Extension

About 150,000 low income families participate in EFNEP each year and food records have been collected by EFNEP for about 100,000 individuals for each of the past ten years. The food records are entered into an EFNEP Evaluation/Reporting System, which is used to determine overall diet quality, based on key indicators: total fat, protein, carbohydrate, fiber, calories, iron, calcium, and vitamins A, C, and B₆, as well as the number of servings of each of the Food Guide Pyramid food groups. The pre and post course recall records are compared against each other for each individual as a management tool to ensure that the educational program is appropriately designed and implemented to lead to desired behavior changes. Participants also receive feedback that shows how their diet compares to the Food Guide Pyramid and RDAs for the key nutrients and the % of calories from protein, fat, carbohydrate and alcohol. Also administered with the food recall is a 10-item food practice checklist covering other behaviors of interest to EFNEP, including food safety, meal planning, use of nutrition labeling, comparing prices and having children eat breakfast. Data are available in national summaries as well as by state and by race (White, Black, Hispanic, Native American and Asian/Pacific Islander).

EFNEP also has a youth program that reaches children from pre-school through high school in school enrichment, after school and summer camp experiences. See Table 25 for numbers of participants reached.

Table 25: Number of EFNEP Participants

Year	Adults	Youth	Total	Family Members Indirectly Reached
00	161,872	459,203	621,075	598,812
01	164,154	447,027	611,181	600,930
02	163,032	405,533	568,565	598,135
03	160,772	389,205	549,977	593,725
04	157,809	378,206	536,015	578,366
Total	807,639	2,079,174	2,886,813	2,969,968

Education

EFNEP is often housed within Departments of Nutrition and Food Science, and is frequently chosen for community nutrition internship opportunities. In Utah and other states, dietetic interns

are given projects and receive training in how to work with low income audiences through work experiences with EFNEP. As a result, not only do the students gain valuable insights into "real world" client interactions, but the EFNEP clients receive expert dietary counseling. [See Portfolio Review report from UT.]

Integrated Programs

EFNEP has been included in many of the integrated obesity projects, as well as the multi-state efforts to combine research and outreach. For example, the youth EFNEP program specialist from Wyoming was a key member of the integrated program to increase dietary calcium intakes in pre-adolescents [W-1003] and EFNEP was also a part of the Win The Rockies obesity intervention project.

OUTCOMES

Short Term

EFNEP focus for adults is on behavior change, which is listed under the Medium-term impacts. For youth, two of the impact measures relate to knowledge gain:

- The number and percent of youth who increase their knowledge of the essentials of human nutrition; and
- The number and percent of youth who increase their ability to select low-cost, nutritious foods.

These impact data are given in the following table 26.

Table 26

Year	% & # of Youth Increasing Knowledge or Ability				
	2000	2001	2002	2003	2004
Essentials of Human Nutrition	76% (101694)	77% (73997)	76% (76555)	75% (77662)	73% (79252)
Selecting Low-Cost, Nutritious Food	71% (66829)	67% (49645)	65% (47008)	66% (50653)	71% (53896)

Medium Term

As discussed above, EFNEP adult programs focus on key clusters of behaviors. Data from the ERS4 are given in the chart below. For the purposes of this chart, only the cluster data are shown, but the accomplishment reports and other data summaries show the more complete detail about behavior change.

Within the food practice clusters, food resource management includes meal planning, price comparison, not running out of food to feed the family, and using grocery lists. Nutrition practices include making healthy food choices, preparing food without adding salt, planning meals, reading nutrition labels and having children eat breakfast. Food safety practices include thawing and storing foods properly. The positive dietary change indicator measures improvement in at least 1 food group toward meeting the recommendations of the Food Guide Pyramid. More detail is available about the change in mean consumption between entry and exit for each of the Food Guide Pyramid food groups, for key nutrients that are often missing in the diets of low income participants, and the proportion of calories from protein, fat, carbohydrate and alcohol. A small sampling of this data is given below. Extensive tables are available as needed. [See table

27 for the cluster summaries and the accompanying graphs for specific behaviors within the clusters. Further examples of the data summaries are found in the Evaluation discussion.]

For youth, eating a variety of foods and improving practices in food preparation and safety are measured.

[See copies of national impact reports on the EFNEP website and in the evidentiary material.]

Table 27: Adult and Youth Impact Measures

Improvement in One or More	Percent and Number of Participants Showing Improvement				
	2000	2001	2002	2003	2004
Food Resource Mgmt. Practices	83% (82575)	83% (82158)	83% (81549)	84% (80418)	84% (74951)
Nutrition Practices	88% (79985)	87% (79964)	88% (79485)	88% (78149)	89% (72505)
Food Safety Practices	67% (66667)	67% (66946)	67% (66033)	67% (64549)	68% (61055)
% with Positive Diet Change at Exit*	93% (99496)	93% (101138)	93% (100154)	93% (97474)	93% (90273)
% Youth Eating a Variety of Foods	74% (93336)	74% (62298)	74% (63001)	82% (65184)	79% (66959)
% Youth with Improved Food Prep & Safety	72% (80467)	73% (60736)	74% (63001)	74% (65402)	69% (69190)

Figure 17

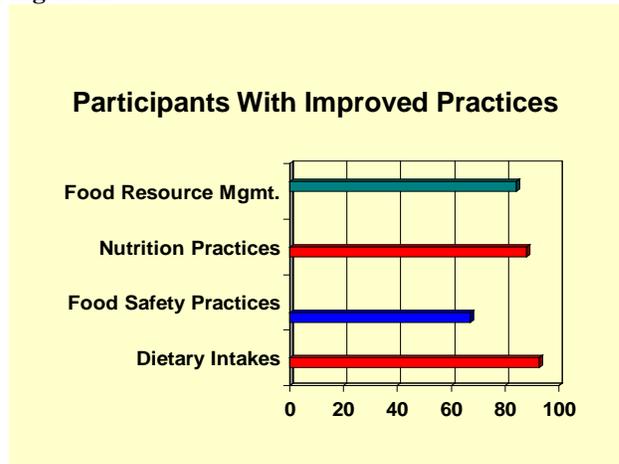


Figure 18

Food Resource Management Behavior Changes in EFNEP

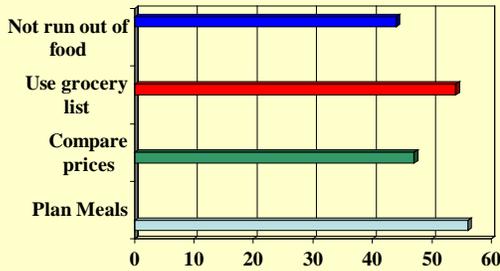
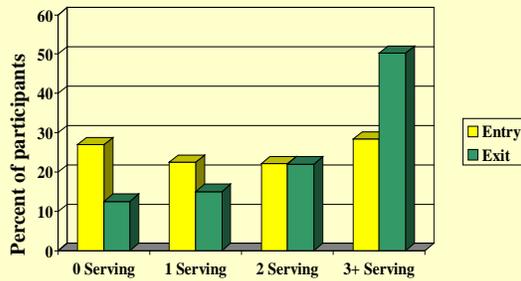


Figure 19

SUMMARY OF FOOD GROUP IMPROVEMENT VEGETABLES — FY 2003



Long Term

Studies have been conducted on EFNEP graduates from 1 to 5 years following completion of the program to determine the degree to which the new behaviors are being retained. These studies show that in fact the practices are continued and in some cases further improvements in diet quality occur. This matches the theory that success in achieving change can lead to success in related areas.

It was possible to look at the effect the diet and practice change can have on reducing the risk of chronic disease that has been associated with poor diets. Changes in spending patterns have also been demonstrated. Thus EFNEP has been found to save up to \$10.64 in reduced health care costs and \$2.48 in food expenditures for every \$1 spent to implement the program (See evidentiary materials for CBA studies).

SUCCESS STORIES

1) Have A Healthy Baby Program: *Healthy Decisions for Healthier Babies*

Issue:

- Low birth weight (LBW) is the number one contributor to infant mortality in Indiana. Preterm birth is the number one contributor to the LBW rate ¹
- 7.6 percent of Indiana babies are born at low birth-weight (2001) ²
- 9.7 percent of infants born to mothers age 10 to 17 were born LBW. 12.9 percent of African-American infants were born at LBW ²
- 11 percent of LBW births are associated with maternal smoking. In Indiana 20.2 % of the mothers smoked during their pregnancies ²
- LBW babies are 64 percent more likely to attend special education classes than normal birth-weight babies ³
- LBW accounts for 10 percent of all health care costs for children (Lewitt et al., 1995).
- Lifetime medical costs of caring for a premature baby is conservatively projected to be \$500,000 per case
- More than 60 percent of private-sector preterm births and LBW cases are preventable ³

What was done:

- Pregnant teens and adults in homes, schools, community centers, and WIC clinics participated in the *Have a Healthy Baby* program
- Prenatal nutrition education program consisting of six lessons
- Emphasizes nutrition and lifestyle choices--smoking, drinking and drugs
- Research based, taught by trained, caring professionals
- A highly visual, interactive, complete curriculum
- *Ten Un Bebe Sano* (for the Latino community)
- *Safe Food and You* (food safety during pregnancy)
- Video lessons for use in physician offices and clinics – 2003
- Spanish version of video lessons anticipated in late 2003

What does it cover?

- Adequate weight gain and healthy nutritional choices
- Consequences of smoking, drinking and drugs
- Importance of early and continuous prenatal care
- Infant feeding choices--breast-feeding and bottle-feeding
- Impact of mother-to-be's decisions on herself and her baby

Where is it taught?

- Throughout the state of Indiana - more than 239 middle and high schools, community agencies and sites
- 35 other states have purchased the curriculum
- Replicated in Iowa, Kansas, and Oklahoma

The Results:

In 2002-03:

- 32 counties provided the program
- 878 pregnant adolescents and at-risk adults were taught.
- Data was obtained on 523 live births
- 67% of smokers report decreased tobacco use
- 50% achieved appropriate weight gain
- 50 of participants initiated breast-feeding
- Decreased neonatal mortality - two deaths reported
- Decreased days of hospitalization with subsequent savings
- Decreased long-term care costs due to healthier babies

- Significant increase in both nutrition knowledge and improvement in intake of healthy foods

Since program initiation:

- Over 12,350 pregnant adolescents and at-risk adults taught
- Fewer low birthweight infants, decreased neonatal mortality and decreased days of neonatal hospitalization
- Significant increase in both nutrition knowledge and improvement in intake of healthy foods
- Significant increase in WIC participation after birth

Participant Comments about Changes Made:

- I changed my mind about breast-feeding & made a lot of good decisions
 - 16 year old in Eastern Indiana
- I heated luncheon meats, exercised by walking more
 - 14 year old in Southern Indiana
- I want to breast feed my baby, stay in school, eat healthy foods so that my baby can be healthy.
 - 15 year old in Northeast Indiana
- I've stopped smoking, started eating right and drink plenty of fluids.
 - 18 year old in Southern Indiana
- I drink more milk; still love to drink it!
 - 17 year old in Western Indiana
- I started eating more healthy. I stopped buying so many hot dogs & bologna, & started buying turkey & ham.
 - 20 year old in Eastern Indiana
- I no longer drink 32 oz. pops, I walk more to try to stay in shape and I stopped smoking.
 - 18 year old in Eastern Indiana

1 Kids Count in Indiana 1999 Indiana Data Book, Indiana Youth Institute.

2 Indiana Natality Report 2001, Indiana State Department of Health

3 March of Dimes Birth Defects Foundation, Statbook: Statistics for monitoring maternal and infant health 2001

EFNEP data has also shown the difference in eating habits of culturally diverse groups. Data from the Evaluation/Reporting System can be summarized in many ways, including comparing results by race and ethnicity of adult participants. Data from twenty-four hour recalls has shown that upon entry into the program, Hispanics consume fewer vegetables than other ethnic groups, but by program exit, the difference in eating habits is narrowed due to nutrition education. Studies have also shown that while all racial/ethnic groups were unlikely to practice desirable food resource management practices upon program entry, substantial improvements were made by the end of the program.

Figure 20

Vegetable Intakes

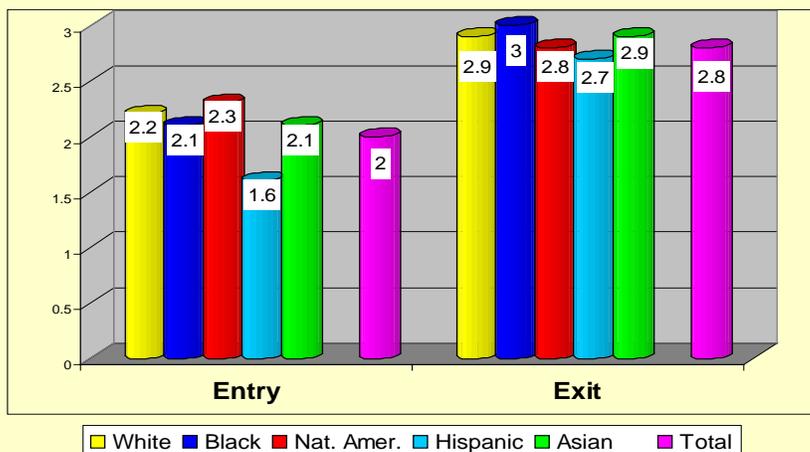


Figure 21

% Following Desirable Food Resource Management Practices

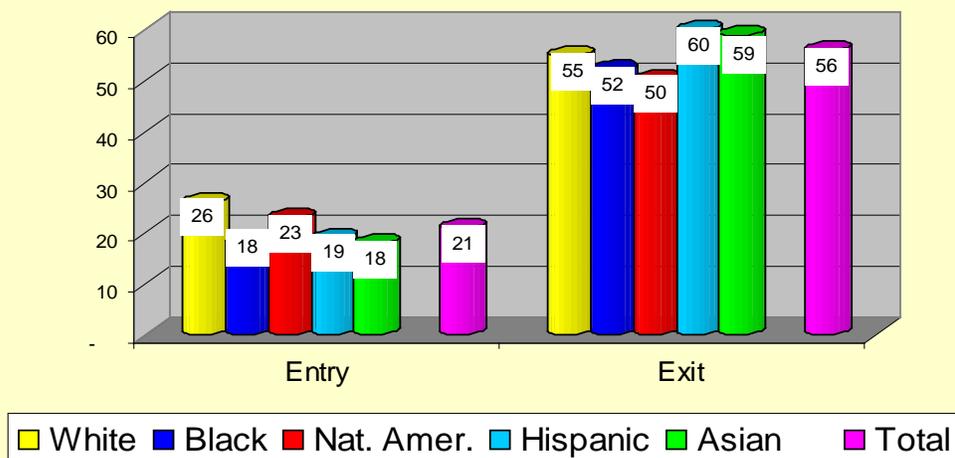


Figure 22



Paraprofessionals are recruited from the indigenous populations with whom they will work and thus serve as role models for the participants.

EVALUATION

Since 1969, states have annually reported the demographics and dietary and food-related behavior change of their EFNEP audience to the federal EFNEP National Program Leader, at CSREES, or its preceding agency. The general purpose of the Evaluation/Reporting System (ERS) is to provide the data needed to assure the quality of the educational program, provide data needed for day-to-day and long-term oversight of the program and the staff who implement the educational intervention and to capture the positive impacts of EFNEP. The system provides a variety of reports useful for management purposes. These include the ability to provide diagnostic assessments of participant needs, and the ability to export summary data for State and National assessment of the program's impact. The specifications for this system were developed collaboratively by a committee made up of representatives from across the United States.

Beginning in 1990, a different approach was taken. To enhance evaluation data quality, a national committee was formed, and they queried states to find out what records were being created in state and county offices to assure effective program implementation. They also asked what other data would be desirable to improve program accountability, eliminate duplication of effort, and facilitate program improvement. This resulted in a bottom-up approach that recognized data quality is improved when the person responsible for supplying the data receives a benefit for their effort. Over the intervening years, the system has grown in response to **user** needs.

The Federal data needs were developed to be in concert with what would be needed locally, and to have data only flow to the point of need. Aggregated data is exported to the state level for use in statewide management and oversight and to report to stakeholders within the University and the state. Similarly, aggregated data – with some fields such as race subcodes being removed— are exported to the Federal level. At the Federal level, reports are prepared for the nation as a whole, for regions, or sub groups such as those also receiving WIC benefits, in order to demonstrate the effectiveness of the program.

No data fields are added unless they serve a broad need, and the data are included in one or more of a wide variety of standard reports. Report writing functions are streamlined, so it only requires a few clicks of the mouse to prepare a report. This reduces the overall reporting burden, since there is not a need to do extensive external data analysis.

Among these standard reports are feedback or diagnostic reports back to the clients showing them how their diet and food practices compare to national standards, reports to quickly scan the records to detect data entry errors, summaries by nutrition educator as part of performance evaluations or assessment of training needs, comparisons of two or more nutrition education curricula to see which one yields the greatest impact and many other examples. One additional principle also played a significant role in the design of the system: the need for flexibility. EFNEP is in all fifty states and the six US territories. The number of participants, amount of resources and the skill level of staff can differ widely. Thus many fields are optional, but can be used if desired, and there are many alternatives for the collection and entry of data.

The existing version of ERS is now seven years old and in need of extensive updating. A new version, to be called the Nutrition Education Evaluation Reporting System, version five (NEERS5), will replace the current system. Among the key changes is an ability to capture the race/ethnicity data using the new required format. In addition, the other modules have been updated to meet user requests or to add new levels of flexibility, enhance report writing options at the state and local level, and provide greater supporting documentation and underlying databases, such as the USDA data files for assessing diet quality and computing the Healthy Eating Index.

SUCCESS STORIES

GAO Assessment of EFNEP evaluation:

On Sept 30, 2002, The Government Accounting Office released a report entitled *Program Evaluation: Strategies for Assessing How Information Dissemination Contributes to Agency Goals* [GAO-02-923]. In the report, GAO defined the purpose of the report as follows:

“In programs in which agencies do not act directly to achieve their goals, but inform and persuade others to act to achieve a desired outcome, it would seem all the more important to assure decision makers that this strategy is credible and likely to succeed. To assist agency efforts to evaluate and improve the effectiveness of such programs, we examined evaluations of five federal information dissemination program cases: Environmental Protection Agency (EPA) Compliance Assistance, the Eisenhower Professional Development Program, **the Expanded Food and Nutrition Education Program (EFNEP)**, the National Tobacco Control Program, and the National Youth Anti-Drug Media Campaign. We identified useful evaluation strategies that other agencies might adopt. ... We are addressing this report to you [The Honorable Fred Thompson, The Honorable Stephen Horn, and The Honorable Janice D. Schakowsky] because of your interest in encouraging results-based management.”

A copy of this report can be found at <http://www.gao.gov/new.items/d02923.pdf> and selected text from the GAO report is appended below.

In September, 2002 the U. S. General Accounting Office presented a report to congressional committees on Program Evaluation: Strategies for Assessing how Information Dissemination Contributes to Agency Goals. (GAO-02-923). To identify ways that agencies can evaluate how their information dissemination programs contribute to their goals, we conducted case studies of how five agencies evaluate their media campaign or instructional programs. To select the cases, we reviewed departmental and agency performance plans and reports and evaluation reports. We selected cases to represent a variety of evaluation approaches and methods. Four of the cases consisted of individual programs; one represented an office assisting several programs.

Most of the instructional programs we reviewed assessed participants' short-term changes in knowledge, attitudes, or skills at the end of their session and relied on follow-up surveys to learn about intermediate effects that took place later. EFNEP and EPA's Compliance Assistance, which had more extended contact with participants, were able to collect more direct information on intermediate behavioral effects.

Most of the programs we reviewed expected the desired behavior change—the intermediate outcome—to take place later, after participants returned home or to their jobs. EFNEP is unusual in using surveys to measure behavior change at the end of the program. This is possible because (1) the program collects detailed information on diet, budgeting, and food handling from participants at the start and end of the program and (2) its series of 10 to 12 lessons is long enough to expect to see such changes.

Both the EFNEP and Eisenhower evaluators attempted to reduce social desirability bias in self-reports of change by asking for concrete, detailed descriptions of what the respondents did before and after the program. By asking for a detailed log of what participants ate the day before, EFNEP sought to obtain relatively objective information to compare with nutrition guidelines. By repeating this exercise at the beginning and end of the program, EFNEP obtained more credible evidence than by asking participants whether they had adopted desired practices, such as eating less fat and more fruit and vegetables.

Some cooperative extension guidance noted that pretest-posttest comparison of self-report results may not always provide accurate assessment of program effects, because participants may have limited knowledge at the beginning of the program that prevents them from accurately assessing baseline behaviors. For example, before instruction on the sources of certain vitamins, participants may inaccurately assess the adequacy of their own consumption levels. The “post-then-pre” design can address this problem by asking participants to report at the end of the program, when they know more about their behavior, both then and as it was before the program. Evidently, participants may also be more willing to admit to certain inappropriate behaviors.⁸

EFNEP routinely measures intermediate behavioral outcomes of improved nutritional intake but does not regularly assess long-term outcomes of nutritional or health status, in part because they can take many years to develop. Instead, the program relies on the associations established in medical research between diet and heart disease and certain cancers, for example, to explain how it expects to contribute to achieving disease

reduction goals. Specifically, Virginia Polytechnic Institute and State University (Virginia Tech) and Virginia cooperative extension staff developed a model to conduct a cost-benefit analysis of the health promoting benefits of its EFNEP program. The study used equations estimating the health benefits of the program's advocated nutritional changes for each of 10 nutrition-related diseases (such as colorectal cancer) from medical consensus reports. The study then used program data on the number of participants who adopted the whole set of targeted behaviors to calculate the expected level of benefits, assuming they maintained the behaviors for 5 years.

The Evaluation/Reporting System represented a collaborative effort among the federal and state programs to demonstrate EFNEP's benefits. USDA staff noted that in the early 1990s, in response to congressional inquiries about EFNEP's effectiveness, a national committee was formed to develop a national reporting system for data on program results. The committee held an expert panel with various USDA nutrition policy experts, arranged for focus groups, and involved state and county EFNEP representatives and others from across the country. The committee started by identifying the kinds of information the states had already gathered to respond to state and local stakeholders' needs and then identified other questions to be answered. The committee developed and tested the behavior checklist and dietary analysis methodology from previous nutrition measurement efforts. The partnership among state programs continues through an annual CSREES Call for Questions that solicits suggestions from states that other states may choose to adopt. USDA staff noted that local managers helped design measures that met their needs, ensuring full cooperation in data collection and the use of evaluation results.

Using research helped agencies develop measures of program goals and establish links between program activities and short-term goals and between short-term and long-term goals. The Eisenhower evaluation team synthesized existing research on teacher instruction to develop innovative measures of the quality of teachers' professional development activities, as well as the characteristics of teaching strategies designed to encourage students' high-order thinking. EFNEP drew on nutrition research to develop standard measures for routine assessment and performance reporting. Virginia Tech's cooperative extension program also drew on research on health care expenses and known risk factors for nutrition related diseases to estimate the benefits of nutrition education on reducing the incidence and treatment costs of those diseases.

CURRENT STATUS

Youth evaluation instruments

A multi-state committee has worked for the past five years on the development and testing of evaluation instruments to be used in measuring the impact of youth EFNEP, FSNE and other nutrition education programs. The initial focus is on behavior changes for 2 age groups -- Pre-K to 2nd grade and grades 3 - 5. All instruments were developed and tested in at least one state, and are now being tested in additional states to assure that they can be used widely. Reliability and validity of these instruments are being determined, in a variety of settings. These instruments are cross-referenced to impact indicators in the Logic Model framework developed for use with FSNE, and once testing is complete, they will be available on a website, along with the documentation on how the instrument was developed and how it is intended to be used. The results of this project will be incorporated into an enhancement of the Evaluation/Reporting System, providing a mechanism to capture youth impact data related to dietary change, physical activity, food safety and other topics, and aggregate the results across programs and states.

This effort has evolved into a new way of looking at youth evaluation. A database has been established on the University of Wisconsin website to house documentation about tools that have been developed. Key characteristics about the tools are provided, along with the purpose for the tool, the age/grade for the participant, and other documentation, plus an electronic copy of the tool. A separate module, called the Youth Question Development (YQD) module has been developed which interconnects users between the WI site and the evaluation system, now called the Nutrition Education Evaluation and Reporting System, version 5 (NEERS 5). The searchable database in YQD will facilitate locating tools that may be of interest by those delivering nutrition and food safety education to youth. They can search by age, content area and other characteristics, and if they find a question or tool they wish to examine in more detail, they can click on a link that will take them to the WI site. At the same time, all tools in YQD will have the response choices and output narratives as defined by the originator, and when a tool is selected for use, the data entry screen will automatically provide a screen specific to that tool and question.

Current efforts are underway to populate the database, and to have criteria for determining the reliability and validity of the instrument. Below is a list of the youth outcomes, core areas and impact indicators:

EFNEP/FSNE Youth Evaluation Measures

Outcome: Youth choose foods according to MyPyramid recommendations

- **Nutrition Knowledge/Attitudes (NUK)**

___% of ___ youth know how to choose foods according to MyPyramid and Dietary Guidelines's (

___% of ___ youth know how to choose food with less fat or sugar

___% of ___ youth can name MyPyramid food groups and/or can identify foods in each group

___% of ___ youth know how to choose healthful snacks &/or beverages

- **Nutrition Behaviors (NUB)**

___% of ___ youth eat nearer to recommended amounts of fat/sugar/calories

___% of ___ youth increase frequency of eating breakfast

___% of ___ youth eat nearer to recommended amounts from Grains group

___% of ___ youth eat nearer to recommended amounts from the Fruit &/or Vegetables groups

___% of ___ youth eat nearer to recommended amounts from Milk group

___% of ___ youth eat nearer to recommended amounts from Meat & Beans group

___% of ___ youth eat nearer to recommended MyPyramid amounts (general)

___% of ___ youth make healthful choices for snacks &/or beverages

Outcome: Youth improve their physical activity practices

- **Physical Activity Knowledge/Attitudes (PHK)**

___% of ___ youth know the benefits of physical activity & how to include it in life

- **Physical Activity Behaviors (PHB)**

___% of ___ youth engage in regular physical activity (biking, hiking, sports)

___% of ___ youth increase participation in physically active games and play

___% of ___ youth reduce time spent in sedentary activities

___% of ___ youth are physically active at least 60 minutes each day

Outcome: Youth use safe food handling practices

- **Food Safety Knowledge/Attitudes (FSK)**

___% of ___ youth know how to wash hands properly

___% of ___ youth know how to keep kitchen area clean

___% of ___ youth know how to avoid cross-contamination

___% of ___ youth know how to keep foods at safe temperatures

___% of ___ youth know how to avoid foods from unsafe sources

- **Food Safety Behaviors (FSB)**

___% of ___ youth wash their hands properly and when necessary

___% of ___ youth keep the kitchen work area clean

___% of ___ youth handle foods to avoid cross-contamination

___% of ___ youth keep foods at safe temperatures

___% of ___ youth avoid foods from unsafe sources

Outcome: Youth make good choices when spending money for food

- **Food Resource Management Knowledge/Attitudes (FRK)**

___% of ___ youth know how to plan meals, make shopping list, look for good prices

___% of ___ youth know how to compare sources and prices when food shopping

- **Food Resource Management Behaviors (FRB)**

___% of ___ youth use good meal planning/food shopping practices

Outcome: Youth acquire the skills to prepare nutritious, affordable foods

- **Food Preparation Knowledge/Attitudes (FPK)**

___% of ___ youth know how to follow a recipe correctly and safely

- **Food Preparation Behaviors (FPB)**

___% of ___ youth make some foods from basic ingredients using recipes

Outcome: Other

- **Other Knowledge (OTK)**
- **Other Behaviors (OTB)**

Diet Quality assessments

Another multi-state team evaluated potential sources of nutrient and food group data, which could be used to upgrade the dietary analysis component of the Evaluation/Reporting System. These alternative sources would expand the list of foods, and increase the number of nutrients that can be analyzed. They also identified new reporting options to increase flexibility and value of the data outputs. The work was nearly complete when the new Dietary Guidelines and MyPyramid were released. These public policy documents were such a drastic change from the previous guidance that major revisions have had to be made. There are now over 7,000 foods in the database, expanded nutrients, and the MyPyramid serving data has been incorporated. Work continues to revise all the output reports.

Race/ethnicity designations

The OMB and many other Federal agencies have adopted new reporting requirements intended to capture information on race and ethnicity of populations being served by Federal programs. EFNEP will be implementing these new guidelines in the next release of the evaluation software. OMB approval of the new reporting system, and compatibility with other related reporting systems, such as the 4-H reports, is still in process.

Geographic Mapping

EFNEP is a part of the agency team exploring the use of geo-political mapping software to increase reporting capabilities. EFNEP program leaders want to be able to show where EFNEP is located, overlaid on data from the Census Bureau, the Centers for Disease Control, and other data sources related to pockets of poverty, high school drop-out rates, stroke incidence or infant mortality, for. This capability will be built into ERS5, and will greatly increase the ability of states to select sites that are in need of services, and to illustrate the impact that EFNEP is, or could make.

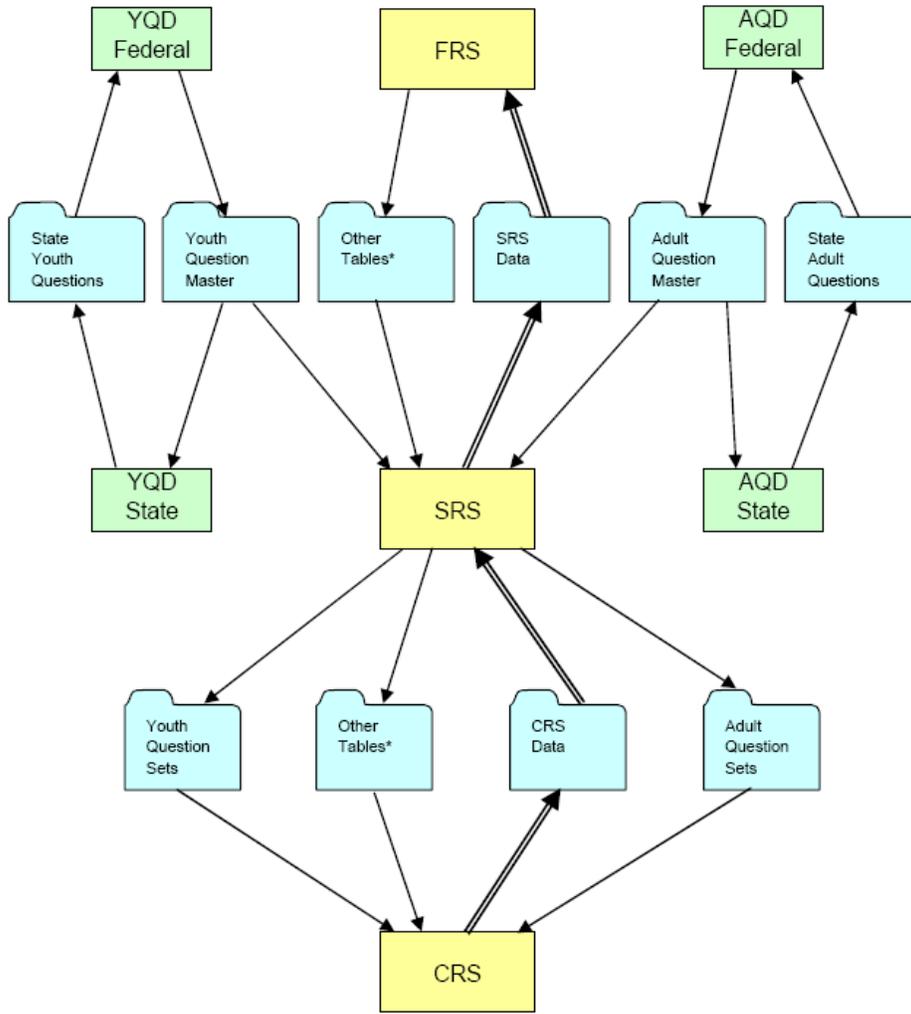
The ability to capture geocoding data for participants has been incorporated into the NEERS 5 system.

Overall

Below is a schematic (Figure 23) that illustrates the complexity and enhancements to the evaluation capability.

Figure 23

NEERS 5 DATA FLOW



* - Other Tables Includes
Foods Database
Poverty Level
RDA
Servings
Subgroups
Filters

NEW DIRECTIONS

Major revision and expansion of the ERS4 to be called NEERS5 – has been underway for about 5 years and will be released in January/February 2006.

Version: January 18, 2006

Annotated Bibliography of EFNEP Research Studies 1995 - 2005
[A copy of the full annotated bibliography will be in the evidentiary materials]

Section VII.

Chronological Index

This section contains a listing of the references starting with the most recent

Coleman, G., et al. Nutrition Education Aimed at Toddlers (NEAT) Curriculum. *Journal of Nutrition Education and Behavior*, 37(2):96-97, 2005

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FOOD STAMP NUTRITION EDUCATION (FSNE)

Food Stamp Nutrition Education (FSNE) is administered by the Food and Nutrition Service (FNS) of the U.S. Department of Agriculture (USDA). Federal Food Stamp Program administration dollars are given to state Food Stamp agencies as a “reimbursement” for up to half of state and local public dollars expended on Nutrition Education. This reimbursement is commonly referred to as “match” within FSNE. The evolution of FSNE and the Land-Grant University System’s involvement as a primary partner is described below.

FSNE began in 1988 when a county Extension educator discovered that by contracting with the state Food Stamp agency, her university could secure federal dollars to expand the reach of nutrition education to low-income persons in her area. Other universities soon followed. In 1992, seven states conducted FSNE using 661,000 federal dollars. By 2004, FSNE was conducted in all 50 states and at least one territory with funding at 228.6 million Food Stamp Program administration dollars and an equal or greater amount from states, representing nearly 460 million dollars total.

Growth of FSNE has occurred mainly through the Cooperative Extension System (CES) and nutrition departments within the Land-Grant University System. By 2004, land-grant colleges and universities were conducting FSNE in all 50 states either in cooperation with other entities or independently, and accounted for more than 80 percent of state and local support (115.7 million dollars) excluding California, where the state health department leads a massive nutrition network separate from the university. Other entities receiving federal dollars for FSNE are state health departments, Indian Tribal Organizations, food banks/pantries, and health organizations.

As FSNE began to grow rapidly within the Land-Grant University System, state Family and Consumer Sciences (FCS) leaders/associate directors requested that their federal partner, the Cooperative State Research, Education and Extension Service (CSREES), provide system-wide leadership to universities and serve as a liaison with other entities, especially FNS. A national program leader was assigned to redirect twenty-five percent time to FSNE in 1999. In 2000, deans and directors from the North Central Extension Region voted to fund a second individual at fifty percent time to help provide leadership. In 2002, the Extension Committee on Organization and Policy (ECOP) agreed to jointly fund the national leadership position through 2004. Later ECOP voted to continue its support through 2008. CSREES shares this cost with Extension directors/administrators, who are assessed according to their financial commitment to FSNE. These costs are separate from funds used to administer FSNE within the states.

Alignment with CSREES Strategic Plan and Portfolio 4.2

The ultimate goal of FSNE within the Land-Grant University System is to “provide educational programs and social marketing activities that increase the likelihood of people making healthy food choices consistent with the most recent dietary advice as reflected in the Dietary Guidelines for Americans and the Food Guidance System with special attention to people with limited budgets” (Medeiros et. al., 2005; Community Nutrition Education (CNE) Logic Model. This goal directly aligns with CSREES’ Mission and Strategic Goal 4, to “Improve the Nation’s Nutrition and Health,” as outlined in Section II of this document. Work in this area is captured primarily in CRIS codes KA 703, “Nutrition Education and Behavior” and KA 704, “Nutrition and Hunger in the Population” of Portfolio 4.2, “Promote Healthier Food Choices and Lifestyles.”

Targeting nutrition education for people with limited incomes, specifically Food Stamp recipients and eligible persons, addresses identified needs among this sector of the population. A recent study from USDA’s Economic Research Service (ERS) found that low-income groups tended to have lower quality diets than high income groups and that one of the factors associated with higher income groups was greater diet and health knowledge (Lin, 2005). Only eight percent of people with very low household incomes (below 131 percent of

the poverty level) had good diets according to the Healthy Eating Index. Another report from ERS noted that Food Stamp Program participants were more likely than higher-income non-participants to consume poor diets according to the Healthy Eating Index (Fox & Cole, 2004). Data for these reports was from the National Health and Nutrition Examination Survey (NHANES-III), conducted in 1988 – 1994, when FSNE was just beginning within the Land-Grant University System. Such data can provide a baseline to assess the effectiveness of FSNE and other educational and assistance efforts over time.

Logic Models

Work in FSNE is described on two levels using two distinct, yet complementary logic models:

1. **National Leadership** – see the “Portfolio 4.2. Promote Healthier Food Choices and Lifestyles: KA 703 Nutrition Education and Behavior and KA 704 Nutrition and Hunger in the Population Logic Model”.
2. **System Leveraging** – see the “Community Nutrition Education (CNE) Logic Model”.

INPUTS

1. National Leadership (see Portfolio Logic Model)

Financial and Human Resources

FSNE began as a grassroots effort to increase nutrition education among the low-income sector of the nation’s population. Universities joined with state and local governments, and other public and private partners to identify or redirect financial and human resources for this work. They contracted with state Food Stamp agencies to secure federal Food Stamp Program administration dollars from FNS. Table 28 (next page) shows: 1) the financial commitment by CSREES and university deans, directors, and administrators for FSNE national leadership; and 2) the financial commitment by universities and FNS for FSNE implementation between 2000 and 2004. Financial commitments from other entities participating in FSNE are not reported, as this portfolio covers only the Land-Grant University System’s involvement.

Changes in the CSREES contribution (Row 1) reflect the transition from supporting FSNE with twenty-five percent of a national program leader’s salary and travel to the use of cooperative support agreements with two land-grant universities to cover operational costs and half the salary and benefits of a national coordinator, secretary, and webmaster (2.15 FTEs in 2004). CSREES also paid for the development of two national reports in FY 2003. Initial contributions by university deans/directors/administrators are unknown, as directors from twelve states provided support directly to the University of Wisconsin-Extension (Row 2, FY 2000-2001). Subsequent financial support by deans/directors/administrators was based on an assessment of all land-grant universities’ FSNE plans. These funds covered special projects and half the salary and benefits of the national coordinator, secretary, and webmaster. Similarly, data on projected costs to implement FSNE (i.e. state and locally identified match) was not collected for the Land-Grant University System prior to FY 2002 (Row 3). Recent increases in the federal FNS commitment (Row 4) relative to the Land-Grant University System’s commitment may suggest increased involvement by other FSNE contractors or increased funding to non-Land-Grant contractors, for large scale social marketing projects.

Table 28: CSREES, Land-Grant University System, and FNS Financial Commitment to FSNE 2000 to 2004*

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
National Leadership Commitment					
▪ CSREES ¹	\$40,000 (Estimate)	\$40,000 (Estimate)	Unknown	\$182,206	\$109,674
▪ University Deans/ Directors/ Administrators ²	Unknown	Unknown	\$174,750	\$175,492	\$167,540
FSNE Programming Commitment					
▪ Cooperative State Extension System (CES)/Land-Grant University System ²	Unknown	Unknown	\$92,997,199	\$112,154,430	\$115,691,405
▪ FNS ³	\$98,963,830	\$142,618,779	\$171,598,089	\$206,753,979	\$228,435,638

*All dollar figures reflect approved budgets, not actual expenditures; Puerto Rico received a block grant for Food Stamp programming and is not reported in these figures.

¹ Sources: Cooperative Support Agreements, Mary McPhail Gray, and Anna Mae Kobbe, September 2005.

² Source: Linda Kay Benning, Food Stamp NEA Assessments, (Assessment for National FSNE Leadership), September 2005.

³ Sources: http://www.nal.usda.gov/foodstamp/National_FSNE.html#about, About Food Stamp Nutrition Education, “Approved Federal Funds for Food Stamp Nutrition Education by Fiscal Year” [PDF], November 2005; and personal communication, Alice Lockett, March 2003.

By 2004, growth within the Land-Grant University System was leveling off, as universities and colleges in all states and at least one territory had FSNE plans (Table 29). In some states, both 1862 and 1890 Institutions were committing financial and human resources toward FSNE (Row 2), although some of the 1890 institutions were having difficulty securing state and local funds for match by this time (McCray, 2003).

Table 29: FSNE Programming by the Land-Grant University System and in States Generally 2000 to 2004*

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Number of states and territories with plans from the Land-Grant University System ¹	47	48	48	49	50
Number of land-grant institutions with FSNE plans ¹	Unknown	Unknown	55	57	56
Number of states and territories with FSNE plans ²	48	48	48	50	52

*Puerto Rico received a block grant for Food Stamp programming and is not reported in these figures.

¹ Source: Linda Kay Benning, Food Stamp NEA Assessments (Assessment for National FSNE Leadership), September 2005. Includes only plans with Extension/Land-Grant University Contracts (1862 & 1890 Institutions).

² Sources: http://www.nal.usda.gov/foodstamp/National_FSNE.html#about, About Food Stamp Nutrition Education, “Approved Federal Funds for Food Stamp Nutrition Education by Fiscal Year” [PDF], November 2005; and personal communication, Alice Lockett, March 2003. Plans from multiple contractors within a state are listed as a single state plan.

Existing Body of Knowledge

Four areas of knowledge have served as a foundation to FSNE's development through CSREES:

- 1) Social science theory (Socio-ecological modeling) which considers education in a holistic context – from the individual to the social environment in which he or she lives.
- 2) Logic modeling which integrates planning, implementation, evaluation, and reporting; links activities to results; and demonstrates accountability with a focus on outcomes (Taylor-Powell, 2005).
- 3) The **Developing A Curriculum** (DACUM) process from vocational colleges which results in an occupational skill profile that can be used in instructional program planning, curriculum development, training material development, organizational restructuring, employee recruitment, training needs, career counseling, and job descriptions (www.ces-fsne.org/slides/dacum/sld001.htm and www.dacum.com/ohio/dacumpro.htm).
- 4) "White papers" on evaluation methodology in four core areas (diet quality, food security, food safety, and shopping behavior/food resource management). Development of these papers was sponsored by FNS and ERS. They were published as a special issue of the *Journal of Nutrition Education* (2001) and are the identified educational focus for FSNE (Food Stamp Nutrition Education Plan Guidance, Federal Fiscal Year 2004).

2. System Leveraging

Supporting information for "System Leveraging" comes primarily from the "Food Stamp Nutrition Education within the Cooperative Extension/Land-Grant University System: National Report – 2002" which represents the first national attempt to capture information about FSNE from the Land-Grant University System (Little & Newman, 2003). Universities and colleges from the Land-Grant System were asked to provide data for FY 2002, based on information they had readily available. Universities from forty-two states and one territory responded. Hereafter, these universities are referred to as "states," since they represent the state partners to CSREES in the CES funding structure. Also used is the "Food Stamp Nutrition Education in the 1890 Community Report," which reflects challenges and opportunities 1890 Institutions face in conducting FSNE (McCray, 2003). These reports were commissioned by the Families, 4-H, and Nutrition Unit, CSREES, USDA. Both are included in the evidentiary materials.

Financial Resources

State and local match for FY 2002 primarily represented monies that were redirected from other efforts to FSNE, in particular, time and effort contributed by state and university personnel and local partners. Importantly, twenty states (forty seven percent) reported a greater than fifty percent match. Their actual contribution exceeded federal reimbursement requirements, which reflected the universities' strong commitment. Overall, reported state/local contributions exceeded federal contributions by 373,604 dollars (Little & Newman, 2003).

Planning Processes

States used a combination of formal needs assessment and secondary data to guide program planning. Most common were the use of advisory boards and state/local agency data. This is not surprising, given CES' strong commitment and ties to local communities, which draws upon the expertise of stakeholders to keep programming relevant to state and local situations.

Materials

States reported the use of more than 200 types of curricula and educational resources. This figure is an overestimate, as resources were listed by different names and some states listed specific lesson plans, whereas others listed curricula packages. Importantly, most states first searched for existing resources from national initiatives/programs and colleagues in other states before attempting to modify or develop their own.

People

Experience working with limited resource audiences, coalition building, and partnerships were considered important to program management in addition to having program and subject matter expertise. Typical positions included project coordinators and other personnel with financial, accountability, evaluation, curricula, teaching (professional and paraprofessional), and technological (information systems, graphic design, etc.) skills. Seventy percent of states reported using professionals and sixty percent reported using paraprofessionals to teach, reflecting the use of multiple teaching approaches in some states.

OUTPUTS

1. National Leadership

Research

Program Management and Evaluation

The CNE Logic Model was developed by a national evaluation committee between 2001 and 2003. Theoretical and practical applications were incorporated into the model, which is intended to: 1) strengthen program management and reporting; and 2) capture the richness of state programming in a consistent, yet flexible way in state and national reports. Program/network coordinators who administer FSNE were given opportunities to provide input at various stages of development and federal agencies with ties to FSNE were kept apprised throughout the development process. Although the model was developed and initially tested with FSNE data, it was created for potential broader application. As suggested by its name, “Community Nutrition Education,” this model is expected to apply in a variety of community settings once it has been refined and tested for FSNE and other programs. Results of the 2003 pilot provide much of the system leveraging content for this portfolio.

This model does not prescribe specific methods and measures (tools) for assessing program success. Rather, its strength is in its ability to integrate program planning, implementation, evaluation, and reporting (Taylor-Powell, 2005). Some states have used or adapted 24-hour dietary recalls, food frequencies and/or behavior checklists from the Evaluation/Reporting System, version four (ERS4) developed through the Expanded Food and Nutrition Education Program (EFNEP) to measure learner outcomes for the CNE Logic Model. Others have used state-developed or curriculum specific methods and measures.

Collaborative Evaluation Efforts

A multi-agency evaluation workgroup, including the Agricultural Research Service (ARS), CSREES, ERS, and FNS has met quarterly since 2001 to collaborate, coordinate, and ultimately engage in joint evaluation research endeavors. In January 2003, ERS hosted a “Research Priorities Workshop” to which university research and extension evaluation leaders, public health experts, and representatives from the National Association of State Universities and Land-Grant Colleges (NASULGC), FNS, and CSREES were invited. This was followed by an ERS hosted Society for Nutrition Education (SNE) post-conference workshop, “Advancing the Practice of Food Stamp Nutrition Education: Art and Science,” in July 2003. Goals were to strengthen local evaluation research and practice and to enhance state and national dialogue on FSNE evaluation. CSREES’ national coordinator for FSNE co-chaired this meeting. Researchers with evaluation expertise and front-line FSNE managers/directors were invited to help enhance evaluation practices and facilitate future in-state and multi-state evaluation activities. Participants noted that the workshop was a “huge leap” for FSNE and stressed the need to maintain momentum and to include states in the national dialogue. Emergent themes were the importance of communicating FSNE success, especially in view of its diverse implementation, and the need for sound outcome measures and strong evaluation as important pre-requisites. Proceedings for both workshops were

posted on the www.ces-fsne.org website and subsequently linked to the ERS website for broader dissemination among social science researchers and program implementers.

In April 2004, following an extensive literature search, ERS brought together thirty-two individuals with FSNE program and research experience (sixteen of whom were from land-grant universities) to assess potential FSNE dietary behavior outcome measures for field-testing nationwide. Discussion resulted in increased understanding that dietary outcome measures for the low-income population are lacking and that in-depth cognitive interviewing at a small number of sites with individuals typical of the FSNE target audience is needed before broad field testing of questions can be done. CSREES' national coordinator for FSNE is on the steering committee as the research protocol is being developed. The end goal is to have a core set of common survey questions that educators and others can use to assess key dietary behavior outcomes for FSNE and similar audiences.

Extension

Professional/Staff Development

"Managing on the Edge of Change," a three-part videotape series targeting professionals that supervise paraprofessionals, was developed in 2000 to help professionals create an environment in which staff can thrive. The training includes segments on hiring, supervising and coaching, and evaluating and documenting. The project was sponsored by assistant directors/FCS Leaders from the North Central Extension region, The Ohio State University; and the Midwest and Mountain Plains FNS Regions (see evidentiary material).

In 2003, a three-part training model was created to strengthen program coordinators' skills and orient new personnel. These materials were based on seven core competency areas identified for successful leadership within FSNE and EFNEP using a modified DACUM process. Included are: 1) an orientation guide for new coordinators and others interested in assessing and developing skills; 2) a resource guide to provide examples of core competency tasks; and 3) a mentoring program for new staff. These resources are on the www.ces-fsne.org website under "Information for Extension/Land-Grant University Coordinators."

A web-based training was developed between 2001 and 2003 to help in creating and using logic models for program management and evaluation. This self-instruction course can be used by any learner. The course consists of two sections: first, "Logic Model Basics," which provides a comprehensive understanding of the use of logic models in program planning, implementation, evaluation, and communication, based on current research and practice; and second, "Introducing a CNE Logic Model," which describes the development of a state, regional, and national model for community nutrition education. This resource was produced by University of Wisconsin-Extension staff with funding from Extension/Land-Grant Universities across the nation. Also contributing to the content for the second section was a national evaluation committee. This course can be found at www.ces-fsne.org under CNE Logic Model.

A top priority for CSREES and FNS since early 2004 has been to facilitate more timely approval of state FSNE plans. In April 2004, forty-five states voluntarily submitted their FY 2004 plans for review by national program leaders and administrators within the Families, 4-H, and Nutrition Unit at CSREES. Recommendations led to a ninety-minute training session repeated four times by teleconference in May. Program/network coordinators from forty-seven states (1862 and 1890 Institutions) participated. In a few states, they were joined by FCS leaders, fiscal officers, and state Food Stamp agency representatives. The training focused on content and format. Policy questions were directed to state Food Stamp agencies and FNS, the federal funding agency for FSNE.

Communication

In 2001, a national website (www.ces-fsne.org) was developed with regional and national list serves, state contact information, and linkages to state programs. It serves as the primary communication mechanism between the national FSNE coordinator and state program coordinators and allows for timely sharing of national actions and initiatives by CSREES, working in conjunction with states, FNS, and ERS. The website also serves as a repository for FSNE related proceedings, web-based trainings, presentations, reports, and other nationally developed resources, and provides opportunity to dialogue and share resources across states.

FSNE program/network coordinators have regular teleconferences (monthly to quarterly depending on the Extension region) to share best practices, problem-solve together, and/or do joint planning. Several regions also have an annual or bi-annual meeting, usually as an add-on to another professional meeting for training, sharing of best practices, and multi-state projects.

CSREES and land-grant university partners hosted a national FSNE conference in Columbus, Ohio in March 2004. The conference was unique in bringing together representatives from state Food Stamp agencies that administer FSNE contracts and state program/network coordinators and administrators that receive FSNE contracts. More than 220 individuals participated, representing forty-nine states and one territory within the Land-Grant University System, eighteen state Food Stamp offices, fifteen state public health, tribal, and other contractors, and representatives from FNS headquarters and regional offices, ERS, CSREES, SNE, and NASULGC. This conference provided an opportunity to increase understanding of organizational cultures, learn FNS' "vision for the future," and raise concerns about the numbers of people who do not have access to this vital education because of difficulties in securing state contracts. Conference proceedings are available on the www.ces-fsne.org website.

Informing Policy/Practice

Rapid growth and complex relationships at multiple levels across organizational systems reflected the need for clear and consistent communication and effective leadership and program management across the Land-Grant University System. In March 2003 a FSNE Program Development Team was created to: 1) serve as a sounding board for national leadership at CSREES; 2) help disseminate accurate information within states/regions; and 3) help identify national/state priorities for effective programming. This team, which has rotating members, has quarterly teleconferences and an annual face-to-face meeting. Members have been instrumental in providing leadership on the national projects herein described.

Given disparities in obesity and nutrition related diseases among low-income and minority households, the legislative mandate, historical ties, experience, and competence that 1890 Institutions have in providing education to such audiences in a comprehensive and culturally sensitive way, and yet their limited involvement in FSNE, the Families, 4-H, and Nutrition Unit of CSREES commissioned a report to explore challenges and opportunities for greater involvement by these Institutions for FSNE delivery. The report cited legislative changes (AREERA and the 2002 Farm Bill) and the evolving nature of FSNE Guidance as the two greatest challenges to 1890 FSNE involvement (McCray 2003). These have resulted in competition for match dollars and increased restrictions in who and what can be taught. Where match has been identified, FSNE funding has created opportunities for 1890 Institutions to teach nutrition education.

CSREES and FNS administrators are engaged in ongoing dialogue intended to resolve barriers to effective nutrition education for at-risk audiences through FSNE. Particular attention has been given to plan submission deterrents and plan approval delays and has resulted in more timely publication of guidance documents for states to use in developing and submitting their FSNE plans. Additionally, CSREES has worked closely with the Land-Grant University System to encourage response to FNS invitations for feedback to FSNE initiatives and to build bridges of understanding and cooperation. As an example, in the summer of 2004, CSREES' national coordinator for FSNE solicited feedback to a "Proposed Policy Framework" document. Seventy-nine

responses (approximately 140 pages) were received, reviewed, synthesized, and summarized for FNS consideration in developing national program policy.

Site visits have been conducted since 2003 to identify state program strengths, potential opportunities, and barriers to success; provide guidance for state-identified areas of concern; and facilitate cross-organizational systems understanding. Visits were made to FSNE staff, university and state agency administrators, and other collaborators in fifteen states between 2003 and 2004; three of these also included FNS and CSREES administrators. Visits to low-income health clinics, senior centers, schools, food pantries, food stamp offices, and similar locations were invaluable in informing national leadership as to where and how to reach the desired audience with effective education and to strengthen program partnerships. Agency administrators were able to see policy in action – what worked well and where additional guidance was needed. States gained better understanding of FSNE from a national perspective – why and how their activities need to fit with national goals and the balance between educational needs and regulatory requirements.

Education

The FSNE audience provides a training opportunity for community service learning experiences for undergraduate students. FSNE has provided community nutrition experiences for nutrition interns, dietetic students, and students engaged in research studies targeting low income/food stamp audiences. Included in the evidentiary materials are examples from Alabama, Colorado, Connecticut, Minnesota, and Wisconsin where students have been directly involved in development of strategies to improve delivery, content, and evaluation of FSNE.

Integrated Programs

The national coordinator for FSNE at CSREES is part of a FCS workgroup that is developing national program indicators. Outcomes and their associated indicators from the CNE Logic Model have been incorporated into early drafts.

2. System Leveraging (See CNE Logic Model)

The ERS/FNS commissioned “white papers” on evaluation methodology (*Journal of Nutrition Education* 2001) in developing the CNE Logic Model, resulted in distinguishing outputs and outcomes by: 1) individuals and households; 2) communities and institutions; and 3) social structures, policies, and practices. Outcomes were further distinguished according to the four core areas that form the basic range of educational categories in FSNE, namely: 1) diet quality: 2) food security: 3) food safety: and 4) shopping behavior/food resource management (Medeiros et. al., 2005; Food Stamp Nutrition Education Plan Guidance, Federal Fiscal Year 2004).

Individuals and Households Level

For the year 2002, when national data was collected, 5,214,654 direct contacts were made with individuals and households through group and individual instruction. Of these, sixty-three percent were Caucasian, twenty-five percent were African American, eight percent were Hispanic, two percent were Native American, and one percent was Asian; fifty-one percent were female and forty-nine percent were male; fifty-six percent were children (5-11 years), eleven percent were youth (12-18 years), sixty percent were adults (19-64 years), seven percent were older adults (65+ years), and ten percent were families. There were 32,330,335 indirect contacts made through newsletters, public service announcements, displays, brochures, health fairs, etc. Primary beneficiaries of FSNE were Food Stamp Program participants and applicants and, to a lesser extent, persons eligible for Food Stamps and other individuals inadvertently reached in group sessions where Food Stamp participants were targeted.

Data was collected on a per-contact basis rather than number of participants, since people may have participated in FSNE through a variety of community settings. For example, a person could receive consistent and reinforcing messages through a series of four classes at a low-income community center, a one-time contact at a local food bank or Food Stamp office, a handout distributed at school for children to give to parents, and a public service educational message on the radio.

Communities and Institutions Level

At the community level, 13,835 state and local public and private partners were identified as working with land-grant universities to give support to FSNE. Forty-five percent of these were schools, forty percent were public agencies, ten percent were non-profit agencies, and five percent were private organizations. Community action was identified primarily as integration of services (fifty-one percent of states); community assessment (forty-six percent of states) and community awareness campaigns (forty percent of states). These figures illustrate the influence that Extension/land-grant universities have in engaging community partners. Such relationships are critical to the success of FSNE, where the target audience is not readily identifiable or accessible in community settings. Community partners provided access to participants, new teaching locations, and both financial and non-financial contributions to FSNE, thereby increasing the magnitude and capacity of what could be accomplished.

Social Structures, Policies, and Practices Level

Nine states indicated working with state agencies (Departments of Education and Health), local schools, state nutrition networks, and Food Stamp offices to provide expert review or comments, hold forums, and/or conduct impact seminars for government officials and the general public on the effects of policy on nutrition and health. Their main focus was on nutrition and physical activity in schools.

Eighteen states reported conducting social marketing campaigns that contained diet quality and physical activity themes, such as increasing fruit/vegetable consumption and physical activity; eating breakfast, and childhood obesity prevention.

OUTCOMES

1. National Leadership

Short Term

Dissemination of FSNE-related research and practices has occurred by various means, such as publications, presentations, media reports, and the www.fsne-ces.org website. These findings have been used to: 1) expand knowledge about program management and evaluation, including factors that influence diet quality (and physical activity), food security, food safety, and food shopping/resource management; 2) create opportunities for professional/staff development; and 3) inform state and federal decision makers on program policy implementation.

Although too soon for specific outcomes to be observed, collaborative efforts by federal agencies, and by research, education, Extension, and other within-state partners are expected to result in both the identification and testing of more effective and appropriate evaluation measures for low-income audiences, and the development of a workforce that is better informed and more experienced with respect to working with and understanding low-income audiences.

Medium Term

Based on the short term outcomes, program management/evaluation strategies are adopted by states, and states contribute new understanding through research and practice to further strengthen FSNE and other low-income nutrition education programming. Based on training received, state coordinators/directors are better prepared to fulfill their FSNE roles. State and national feedback to community leaders and policy makers results in developing informed program policy that supports healthy diets and physical activity, and improves food security among the target audience.

Long Term

Ultimately, the health of Americans with limited incomes is improved, resulting from continued emphasis on, support for, and improvements in diet quality/physical activity, household and community food security, food safety, and shopping behaviors/food resource management. Long term outcomes are not yet evident for FSNE.

SPECIFIC EXAMPLES

1) Program Management and Evaluation

- a) ***Short Term:*** Initial development and testing of the CNE Logic Model was recently published in a peer reviewed journal to increase knowledge of its history and potential usefulness among nutrition education practitioners and researchers involved with FSNE and Community Nutrition Education (Medeiros et. al., 2005). This model showed that diet quality, food security, food safety, and shopping behavior/food resource management impacts could be captured nationally without losing the richness and flexibility of nutrition education implemented according to locally identified needs and resources.
- b) ***Medium Term:*** Forty-two states and one territory provided feedback on FSNE programming in the context of the CNE Logic Model in FY 2002, which allowed for consistent planning and reporting about FSNE within the Land-Grant University System, and the inclusion of national data for this portfolio (e.g. the “system leveraging” components). States were also encouraged to use the CNE Logic Model to strengthen state and local program management and report to state and community decision makers. At least four states (Arizona, Missouri, Ohio, and Wisconsin) are using the CNE Logic Model to guide program planning, implementation, evaluation, and reporting for FSNE.

Development of the CNE Logic Model has resulted in other research opportunities. Faculty members from The Ohio State University, Colorado State University, and Washington State University (Medeiros, Kendall, and Hiller – see evidentiary materials) completed baseline research to identify food safety competencies and behaviors that are most likely to affect the availability of safe food in homes. These behaviors were incorporated into the program indicators for the food safety component of the CNE Logic Model. They have been published in peer-reviewed journals to increase knowledge of researchers and practitioners interested in food safety issues for at risk audiences.

FSNE Program Development Team members representing the four Extension regions of the country have reported that FSNE has led to the integration of Extension and research, with coordinators becoming part of research teams in some nutrition departments. By combining FSNE and other funding resources, tapping into an underserved audience, and conducting applied research, state researchers and educators are using their ingenuity to connect research, education, and Extension to increase the reach and quality of education delivered for more successful and meaningful outcomes. This is reflected in the accompanying evidentiary material. As a specific example, use of CSREES’ National Research Initiative Competitive Grants Program (NRICGP), FSNE, Share our Strength, and Extension state funds for different components of development or enhancement of La Cocina Saludable

at Colorado State University, resulted in a product that is research based and has multiple methods of application, making it a more flexible and adaptable resource for educators and participants, alike. Another example is Wisconsin's first Nutrition Network statewide campaign, "Jump 'n Jive: Come Alive with Fruit," which was based on multi-state research conducted on low-income mothers' stages of change and behavioral motivators for fruit and vegetable consumption.

Program clarification from FNS since 2004, emphasizing increased focus on program delivery, may result in decreased opportunities to leverage FSNE funds for high quality, participant-appropriate program resources and activities in the future.

2) Professional/Staff Development

- a) **Short Term:** Staff that used the new staff core competency training resources and took advantage of other training opportunities commented on their usefulness to FSNE Program Development Team members and the national coordinator for FSNE at CSREES. Following the national plan preparation training, the national FSNE coordinator received fewer program clarification questions on content that had been discussed.

Medium Term: Core competency materials were used by Missouri in conducting professional development for FSNE professionals through a research roundtable. Pennsylvania used these materials in a train-the-trainer format for professional development of Nutrition Network members – not all of whom were from the Land-Grant University System.

Early plan approval indicators for FY 2005 were promising thus suggesting reviews of the 2004 plans and follow-up national training had a positive effect. Most states received at least partial approval within the first few weeks on the contract period. However, nearly five months later, three states were still dealing with internal issues, one state had only partial funding, and six states were seeking approval for funds that had been disallowed. Although improvement in the timeliness of plan approval was seen over the previous fiscal year, these results suggested that continued information gathering is needed to identify gaps in understanding of FNS' FSNE policy, further training is needed to help states improve the completeness and quality of their plans, and continued dialogue is needed between CSREES and FNS to improve consistency of policy interpretation across FNS regions.

3) Communication and Informing Policy/Practice

- a) **Short Term:** Evaluations from the National FSNE Conference in 2004 showed that the single greatest perceived benefit was the opportunity for "all stakeholders" to learn first hand from FNS about changes in the FSNE Plan Guidance and future directions, and to engage in frank and open discussion about what dictates national policy and what is needed for FSNE to be successful at the state and local level. Participants also valued networking and sharing of ideas and resources within Extension and with public health, state Food Stamp offices, and regional FNS contacts, noting that the conference afforded a rare opportunity to have such dialogue. Most respondents felt it was "extremely important to continue this effort because of the need for communication between agencies and among programs."
- b) **Medium Term:** Tracking plan approval began in FY 2003 after states had voiced considerable frustration over delays and communication gaps in the approval process. By 2004, some improvement was seen, as noted above. Approval delays that extended well into the new fiscal year and concerns about interpretation of FSNE Plan Guidance led to increased communication within CSREES, with Land-Grant University contacts, and with program partners, particularly FNS administrators, which resulted in more accurate information about state-identified concerns and perceived inconsistencies in

policy interpretation across the country. CSREES and FNS administrators also conducted a joint agency site visit to learn more about implementation of FSNE at the state and local level.

Also beginning in FY 2004, Extension directors/administrators took a more active role in FSNE. Directors/administrators representing universities in the Extension Southern region met with FNS regional administrators to develop better cross-organizational understanding and begin a dialogue on opportunities and challenges resulting from organizational differences.

System-wide response to the FNS Proposed Policy Framework in 2004 contributed to a revised document from FNS in September 2005 (see FSNE Guiding Principles, www.fns.usda.gov/oane/menu/FSNE/FSNE.htm) that seemed more amenable from a Land-Grant University System perspective for program implementation in a community context. Clarification was given as to the purpose of the document, its intended target audience, educational strategies, message focus, and respective responsibilities. Interpretation and training on this document is still needed for system-wide understanding and program implementation.

State perceptions of the need for and accomplishments coming from CSREES national leadership is most evident in ECOP's decision to extend its financial support of the FSNE national coordinator position through 2008.

4) System Leveraging (See CNE Logic Model)

- a. **Short Term:** Individuals and households gain awareness, knowledge, and/or skills; communities and institutions gain awareness and become involved in addressing challenges faced by low-income populations; and/or educators, media, and other public and private representatives hold discussions regarding policies, regulations, and industry practices that are barriers to each of the core areas of FSNE. (See the CNE Logic Model for specific types of knowledge, awareness, and/or skills to be gained).
- b. **Medium Term:** Individuals and households and communities/institutions change specific behaviors based on knowledge and skills gained; communities and institutions develop and implement plans to address challenges identified; and/or educators, media, and other public and private representatives work toward needed changes in laws, policies, and practices. (See the CNE Logic Model for specific types of behaviors to be changed and/or community and/or social action taken to effect change).
- c. **Long Term:** Individuals and household experience improved conditions in one or more of the core areas; community leaders and citizens are empowered to solve challenges and reduce barriers; and/or laws, policies, and practices are revised to improve social structure, policy, or practice. (See the CNE Logic Model for specific types of conditions expected, and/or community/social conditions experienced to support change).

Understanding of external factors, research, and evaluation are critical to determining the actual influence of FSNE in evoking change.

CNE Logic Model National Report

Context

A challenge for gathering data on FSNE outcomes was that the work had evolved at the grass roots level. Programming across the country was diverse in what was being taught, assessment methods and measures used, and outcomes realized. Although states were aware of the CNE Logic Model and many had contributed

feedback during its development, there was little consistency within and among states as to the type of impact data that they collected. Consequently, initial testing of the CNE Logic Model was designed to capture the richness of what was happening through FSNE rather than the extent to which FSNE achieved a specific objective or one outcome led to another. States were asked to write four to six impact statements that illustrated the results of their efforts for any or all of the core educational areas; a template for completing the impact statements was provided. The data provided a “snapshot,” or baseline information to guide future planning, implementation, evaluation, and reporting within states and nationally. These data were then analyzed for the identification of deemed variables.

Of the forty-three states that submitted 2002 FSNE data, forty (ninety-three percent) provided impact statements. Three hundred forty-nine examples of outcomes (referred to as “indicators” of outcomes in the CNE Logic Model) were identified from the 136 impact statements that were provided.

Levels of Intervention - Socio-Ecological Model

More than ninety-eight percent of outcomes were reported at the individual and household level; only one percent of outcomes was reported at the community and institution level; and less than one percent was reported at the social structure, policies, and practices level. This is not surprising. States had not previously been asked to report on community or social policy and practice outcomes; they may not have been collecting that kind of information.

Time Frame – Short/Medium/Long Term

Forty-six percent of reported outcomes were short term, where FSNE participants had gained knowledge or skills. Examples were: demonstrated ability to use the Dietary Guidelines and Food Guide Pyramid to plan meals and make food choices; demonstrated ability to use appropriate shopping techniques to save money on food; and demonstrated ability to practice kitchen cleanliness and washing hands for good health based on the Food Guide Pyramid and Dietary Guidelines.

Fifty-two percent of reported outcomes were medium term, where participants had changed behaviors. Examples included: planning meals and selecting foods based on the Dietary Guidelines and Food Guide Pyramid; using shopping techniques such as a shopping list, comparing prices, and using coupons to save money on food; practicing kitchen cleanliness including washing hands for good health; increased level of physical activity; and increased practice of keeping food at safe temperatures.

Not surprisingly, only two percent of reported outcomes were of changes in long-term conditions. FSNE is still relatively new in many states and the educational focus has been primarily on short to medium term interventions. Few states have been tracking longer term results.

FSNE Core Areas

More variation was seen in educational focus of reported outcomes: forty-four percent were improvements in diet quality; seven percent were improvements in food security; twenty-eight percent were improvements in food safety, and twenty-one percent were improvements in shopping behavior/food resource management.

Evaluation Methods and Measures

Both quantitative and qualitative methods were used to assess success. Quantitative measurement tools included: state-designed instruments (sixty-three percent of states); behavior checklists (thirty-four percent of states); 24-hour food recalls (twenty-nine percent of states); curriculum-based evaluation tools (eighteen percent of states); and tools modified from EFNEP (thirteen percent of states). Qualitative data collection methods, reported by thirty-two percent of states, included oral surveys, open-ended oral or written questions, and interviews.

Identified Program and Research Needs

Top needs identified for improving programming were: program evaluation (sixty percent of states); data collection (forty-three percent of states); hiring and training staff (thirty-four percent of states); and developing partnerships (twenty percent of states). The top three research needs identified were: diet quality and physical activity (twenty-seven percent of states); longitudinal studies (twenty-one percent of states); and food security status (eighteen percent of states; multiple responses were allowed). Identified program and research needs seem to suggest that current national priorities – program management/evaluation and program/staff development – are on track.

SUCCESS STORIES

The following success stories represent a small selection of program impacts provided by state FSNE Coordinators, primarily in response to the CNE Logic Model pilot in FY 2003. Although they were based on a variety of evaluation methods and measures, they can be directly linked to the CNE Logic Model in terms of levels of intervention, time frame, and FSNE core areas. They represent the influence of FSNE at the individual and household level, as ultimately, all efforts – state, national, and otherwise – need to be directed to change or support an environment for change at that level.

1) Food Safety

- a) **Short term:** Florida has a highly diverse culture and ranks among the top ten states in incidence of food borne disease; the majority of which is caused from microbial contamination in homes and commercial eating establishments. During FY 2002, 4,854 FSNE participants were taught about food safety. Of these, eighty-seven percent (4,227 individuals) showed improved food safety skills, especially hand washing practices. Resources were developed in multiple languages to increase participant understanding.

Queso fresco, a soft cheese traditionally made with raw milk, has caused multiple food borne illness outbreaks. Oregon initiated programming to teach Hispanics how to make queso fresco safely using pasteurized milk. In 2004, 275 Hispanics participated in either single queso fresco classes or as part of nutrition education series in seven counties or areas. Participants received a thermometer, Rennet and cheese cloth courtesy of the Oregon Dairy Products Commission. A sample of participants (sixty-eight individuals) was later surveyed by phone interviews to evaluate impact. Ninety percent correctly believed that you can get sick if you use (raw) milk from a dairy without heating it first. Sixty-five percent reported making queso fresco using the recipe provided in class. All had used milk from the grocery store and had used the thermometer to make the cheese; forty-six percent had also used the thermometer to check the temperature of other foods including poultry, cooked meat, stew, and flan (a desirable food safety practice). Fifty-six percent of respondents had given the queso fresco recipe to friends or family. Comments (translated) included: “(The class) was useful because we Hispanics eat much of the cheese and it’s very expensive in the store and now learning the recipe is more economical and healthier.”

2) Food Shopping/Resource Management

- a) **Short Term:** In Wisconsin, 2,000 adult learners were taught about food resource management in FY 2002. Eighty-seven percent of these learners reported verbally that they had learned something new, or would do something differently after their lesson. Specifically, eighty-seven percent of participants who received a lesson on using food stamps and other food assistance programs, said they learned something that would make it easier for them to get enough food or money for food; ninety-eight

percent of 134 participants who received a lesson on wants and needs were able to distinguish between the two; eighty-seven percent of 423 participants who were taught about saving money when eating away from home said they had learned a new way to eat away from home occasionally without spending too much, and ninety-nine percent of 336 participants who learned about choosing low cost foods based on the Food Guide Pyramid could name a nutritious low-cost food they would buy for their family.

- b) ***Medium Term:*** In Utah, the Evaluation/Reporting System (ERS4) developed by EFNEP was used to assess pre- to post- instruction changes for 472 adults who received six FSNE lessons on Food Shopping and Resource Management in FY 2002. Of these, sixty-six percent (272 participants) utilized a menu plan more often, 49 percent (203 participants) shopped from a list more often, fifty-one percent (208 participants) comparison shopped more often; and fifty-four percent (224 participants) said they had enough to eat more often upon completing the class.

3) Multiple Core Areas

- a) ***Short and Medium Term:*** According to US Census data, Arkansas ranked 6th in the nation for the percent of persons living in poverty between 1996 and 1998. In 2002, the poverty rate in rural Arkansas was sixty-five percent higher than the national average (21.2 percent vs. 13.8 percent, respectively) and was highest in the Delta region (27.6 percent). The incidence of diet-related health problems was also higher in the Delta than in surrounding counties and other parts of the country. A culturally sensitive nutrition curriculum developed by and for 1890 Institutions was used with 256 adult FSNE participants. Written and oral responses to curriculum designed data management survey tools showed upon completion of the FSNE, sixty-nine percent of participants reported an increase in knowledge about basic nutrition, eighty-nine percent considered healthy food choices when deciding what to feed their families, twenty-seven percent planned meals one week in advance, sixty-five percent used a grocery list in shopping for food, seventy-four percent compared prices before buying food, and seventy percent used planning and implementing strategies to ensure that food lasted through the month. Concurrently, local food pantries reported a decline in the number of people asking for emergency assistance.

Pregnant and parenting teenagers are a hard audience to engage. New Hampshire works closely with the Visiting Nurses Association, WIC, homeless shelters for pregnant women and the Division of Children, Youth, and Families to get referrals to its FSNE “Great Beginnings for Pregnant and Parenting Teens” program. Participants “graduate” from the course if they attend six lessons and complete pre- and post-food recalls and behavioral checklists. Of the twenty-four teenagers who completed the program in 2002, seventy-seven percent reported making a positive change in their intake for at least one food group, 100 percent reported eating three or more meals and snacks, eighty percent showed improvement in one or more food resource management practices (planning meals, comparing prices, and not running out of food), seventy-five percent showed improvement in one or more nutrition practices (planning meals, making healthy food choices, and reading food labels), and sixty percent showed improvement in one or more food safety practices (such as thawing and storing food properly).

Of 200 adult FSNE participants in Mississippi that were taught about the Food Guide Pyramid and proper food shopping and cooking (food safety techniques), there was a twenty-one percent increase in the number of participants who increased their intake of fruits and vegetables to five or more servings per day, a thirty-four percent increase in the number of participants who increased their intake of foods from the milk group to three a day, a twenty-one percent decrease in the number of participants who let meat and dairy foods sit out for more than two hours, a sixty-six percent increase in the number of participants who cooked eggs until they were no longer runny, and a thirty-five percent increase in the

number of participants who compared prices before they bought food. These changes were identified through a post- then pre-test evaluation method. Participants were asked what they would do after participating in FSNE after which they were asked what they had done prior to the classes.

In New Jersey, 3,307 adults participated in FSNE, of which 1,544 adults attended four or more classes. Of those completing at least four classes, eight-seven percent reported at least one improved nutrition practice, seventy-six percent reported at least one improved food shopping/resource management practice, and fifty-eight percent reported at least one improved food safety practice. Additionally, thirty-three percent fewer families reported running out of food by month's end. More specifically, thirty-one percent of these participants reported thinking more often about making healthier food choices, fifty-five percent reported using the Nutrition Facts panel on food packages to make healthier choices more often, thirty-two percent of participants reported comparing prices more often when shopping, and thirty percent fewer participants reported letting foods sit out on a counter to thaw. Data was collected using a pre- and post-education survey and the ERS4 Behavior Checklist.

Ultimately, change occurs, person by person. Following are three examples of FSNE's influence on a personal level – all reported for FY 2002.

A woman in Nebraska was referred to FSNE by her Food Stamp case worker. She and her family only had fifty dollars to spend on food every two weeks. She was very concerned as to how her family of three was going to survive. The FSNE staff member taught her and her husband about meal planning and had them plan for the next two weeks using the food that they had on hand. They made a grocery list of the items they needed to purchase for the next week. She taught them to compare costs using unit pricing, something they had never done before. One month later, the client was still planning meals on a weekly basis, grocery shopping with a list and comparing prices. She said that the tips she learned have allowed her family to get by on fifty dollars for groceries every two weeks.

A [FSNE] program assistant in Iowa worked with a family who was coping with lack of food and medical consequences stemming from nutritional inadequacies and obesity. Within six weeks, the whole family was eating more nutritiously and beginning to lose weight at a healthy rate. The mother and father stopped drinking soft drinks, planned meals two weeks ahead and shopped twice monthly with a list. They reduced their food costs by fifty percent, making it possible to have enough food to last until the end of the month. They are now more eating nutritious, balanced meals, which has helped reduce their medical complications and their weight. When asked to evaluate [FSNE], their response was "No one ever told us these things. We are so grateful!"

Susan (not her real name), from Oregon, was a 25-year old pregnant, single mother with a 16-month old child. She attended school and worked part-time. Stressed and on the run, she told the FSNE instructor she barely had time to eat at all. Her 24-hour diet recall confirmed that her nutritional intake was inadequate. Susan participated in a series of classes at a low-income housing site. Collaborating partners provided childcare and a bag of food that she could take home to try the recipes that had been shared in class. After six weeks, Susan had increased her fruit and vegetable intake, made meals from basic ingredients, and learned food preparation skills that boosted her confidence and enabled her to move to more complicated tasks like overseeing the cooking of a stir-fry dish. This experience was especially important because it enabled Susan to encourage her toddler to sample new foods. The change in her attitude about food preparation and food choices is noteworthy because it affected the health and well being of her toddler and unborn baby. The group support, nutrition information shared and skills gained, along with the social interaction Susan experienced with other parents, were strong influences on the changes that she made.

NEW DIRECTIONS

FSNE priorities are based on input from Extension directors/program administrators, the FSNE Program Development Team, the CSREES Families, 4-H, and Nutrition Unit, and program stakeholders. Plans are to continue current priorities: 1) to create a meaningful and user-friendly program management online system that supports efficient and effective programming; 2) to develop professional and staff competencies; and 3) to work through organizational differences for greater communication and understanding within and across federal agencies, with states, and with other partners to the end goal of improving nutrition education for target audiences that supports enhanced skills and improved food and physical activity behaviors leading to better health. Specifics follow:

Program Management and Evaluation

Completion of the national report using 2002 data demonstrated the need for further refinement of the CNE Logic Model, greater use of “forced” choices based on data received, more specificity and clarity for certain items, and further developing of the model into an online program management and reporting system that is able to benefit states individually and the Land-Grant System as a whole. Continued collaboration is also needed within CSREES and with other agencies – especially FNS, ERS, and ARS to strengthen evaluation through program logic, social science theory, and valid, reliable, and practical methods and measures. The number of curricula used within FSNE also needs to be addressed. “Best resources” need to be identified, screening criteria for selection needs to be developed, and/or state leadership (rather than local choosing) needs to be encouraged to support increased use of evidence-based resources and activities, matched appropriately to target audience needs. Work is continuing on the CNE Logic Model, CSREES is part of a diet quality evaluation measure steering committee, and discussion is underway at CSREES for a system solution that supports more consistent use of evidence-based methods and materials.

Professional/Staff Development

The core competency development process now available to program coordinators and administrators is to be replicated for paraprofessionals. Additionally, state program coordinators, especially those new to this position and their supervisors are to be directed to resources that have been developed to facilitate their success with this multi-organizational partnership.

Communication/Informing Policy and Practice

Continued information gathering is needed to identify gaps in understanding of FNS’ Food Stamp Nutrition Education Plan Guidance (the document used to prepare state plans), further training is needed to help states improve the completeness and quality of their plans, and continued dialogue is needed between CSREES and FNS on consistency of Guidance interpretation across FNS regions and understanding of organizational strengths and differences that may support or hinder effective FSNE programming. CSREES will continue to work with FNS and universities to identify and seek resolution of delays and agency/organizational differences associated with the FSNE plan approval process. CSREES will also continue focus on increased nutrition education (FSNE and otherwise) for 1890 and other similar institutions where contributions may not qualify for match because of federal requirements, creating an artificial limitation to the reach of potential participants in areas of exceptionally high need. CSREES will also continue dialogue with FNS and other agencies regarding the role of physical activity in FSNE for improved alignment with the Dietary Guidelines and My.Pyramid.gov; explore similarities/differences in accountability requirements across Systems that may improve or hinder programming, and work internally, through the Families, 4-H, and Nutrition Unit at CSREES for increased integration, complementation, and coordination of program efforts.

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EVIDENTIARY MATERIAL – Food Stamp Nutrition Education and Related Materials

SPECIFIC TO FSNE

1) National Efforts

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 - Puerto Rican Food Guide Pyramid Fact Sheet [also in Spanish]
 - Bilingual Food Label Fact Sheet
 - I Didn't Know I had it: Preventing Diabetes in the Family [booklet, also in Spanish]
 - The Power of Love and Support: A Romantic Breastfeeding Story [booklet, also in Spanish]
 - From the Farm to the Table: Bilingual Coloring Book
 - Bean Magic [tip sheet with recipes, also in Spanish]
 - Cooking With Bread [recipe booklet, also in Spanish]
 - Simply Soups [recipe booklet, also in Spanish]
 - Food Link Newsletter [information, recipes, articles also in Spanish]
 - UCONN Food Stamp Nutrition Education [brochure, also in Spanish]

- Seniors, the new EBT Food Card is here for YOU! [brochure]
- Skillet Meals [fact sheet]
- A Senior's Guide to Home Food Safety [booklet]
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Wyoming

Version: January 18, 2006

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FSNE CONNECTION

1) Multi-state Efforts

a) Audience for other funded research [some also EFNEP]

- Medeiros L, Hillers V, Chen G, Bergmann V, Kendall P, Schroeder M. Design and development of food safety knowledge and attitude scales for consumer food safety education. *Journal of the American Dietetic Association* 2004;104:1671-1677. [NRI-#99;35201-8126]
- Kendall P, Medeiros LC, Hillers V, Chen G, DiMascola S. Food handling behaviors of special importance for the pregnant, young, elderly and immune compromised. *Journal of the American Dietetic Association*, 2003;103:1646-1649. [NRI #99-342018126 & Food Safety Quality National Initiative project grant EFSQ-6]
- Medeiros LC, Hillers VN, Kendall PA, Mason A. Evaluation of food safety education for consumers. *Journal of Nutrition Education* 2001;33:S27-S34. [ERS – 43-4EM-8-80096]
- Olson CM, Anderson K, Kiss E, Lawrence FC, Seiling SB. (2004). Factors protecting against and contributing to food insecurity among rural families: a mixed-methods analysis. *Family Economics and Nutrition Review*, 16(1)12-20. [NC-223]

b) Professional Staff Training – Supervision

- “Managing on the Edge of Change” is a three-part video tape series targeting professionals who supervise paraprofessionals. The three segments (videos) are: 1) hiring; 2) supervising and coaching; and 3) evaluating and documenting. Each video tape includes an interview with an expert and vignettes of exchanges between a professional and a paraprofessional to illustrate best practices. The video tapes can be used singly, in a series, and/or in any order. The project was sponsored by the North Central Region Assistant Directors and State Leaders of Family and Consumer Sciences, CSREES; The Ohio State University; and the Midwest and Mountain Plains Regions of the Food and Nutrition Service, USDA, Ohio Department of Human Services Education and Training Consulting contract #0-00-06-559/00-249. Order from: Ohio State University Extension, 342 Campbell Hall, 1787 Neil Avenue, Columbus, OH 43210. 614-688-5378

2) State Efforts

a) Advisory Role

Wisconsin

- Chang MW, Nitzke S, Brown T, Baumann LC, Oakley L. Development and validation of a self-efficacy measure for fat intake behaviors in low-income women. *Journal of Nutrition Education and Behavior* 2003;35:302-307.

b) Assessment and Training

Iowa

- Food Security, Insecurity and Hunger Project – 4 policy papers, 6 technical papers, a hunger website, training for staff and community members, and a video and Leaders Guide, “Food for All? The Status of Hunger in Iowa.”
 - Food for All? The Status of Hunger in Iowa, Iowa State University Extension [video, leaders guide, fact card]
 - Emergency Food Resources: Meeting Food Needs of Iowa Households [policy paper]
 - No More Food Stamps: Iowa Households that Left the Food Stamp Program [policy paper]
 - How Iowa Fares: Food Insecurity in Iowa and the United States [policy paper]

- Rural Food Access Patterns: Elderly Open-Country and In-town Residents [policy paper]
- Food in My Community: A Case Study of a Des Moines, Iowa Neighborhood; Sociology Technical Report No. 1002
- Food in My Community: A Case Study of a Davenport, Iowa Neighborhood; Sociology Technical Report No. 1003
- Food in My Community: A Case Study of Decatur County; Sociology Technical Report No. 1004
- Food in My Community: A Case Study of Monroe County; Sociology Technical Report No. 1005
- Food in My Community: A Case Study of Palo Alto County; Sociology Technical Report No. 1006
- Food in My Community: A Case Study of Floyd County; Sociology Technical Report No. 1007

3) **Resource Development and Evaluation**

a) Massachusetts

- Combination of EFNEP, FSNE, and University of Massachusetts Extension Strategic Investment funding [See hard copy of email attachment, sent by Jean Anliker September 9, 2005]
 - CHOICES: Steps toward Health - A new English and Spanish curriculum based on learning by dialogue, for FSNE participants.
 - Stages of Change - A study of how FSNE programs impact participants' stages of change for eating more fruits and vegetables, less fat, and doing more physical activity.
 - Pumpkin Post and Banana Beat and Travels and Tastes through Time - Development and evaluation of two newsletters for families of preschool children.

USED TO INFORM FSNE – i.e. States reported use for FSNE planning, programming, and/or involvement of FSNE participants in studies

1) **Multi-state Efforts**

- Reicks M, Smith C, Henry H, Reimer K, Atwell J, Thomas R. Use of the think aloud method to examine fruit and vegetable purchasing behaviors among African American low-income women. *Journal of Nutrition Education and Behavior* 2003;35:154-160.
- Quan T, Salomon J, Nitzke S, Reicks M. Behaviors of low-income mothers related to fruit and vegetable consumption. *Journal of The American Dietetic Association* 2000;100:567-570.

2) **State Efforts**

a) Minnesota

- Henry H, Reicks M, Smith C, Reimer K, Atwell J, Thomas R. Identification of factors affecting purchasing and preparation of fruit and vegetables by stage of change for low-income African American mothers using the think aloud method. *Journal of The American Dietetic Association* 2003;103:1643-1646.
- Lee S, Reicks M. Environmental and behavioral factors associated with calcium intake by low-income adolescent girls. *Journal of The American Dietetic Association* 2003;103:1526-1529.
- Tucker M, Reicks M. Exercise as a gateway behavior for healthy eating among older adults: An exploratory study. *Journal of Nutrition Education and Behavior* 2002;34 (Suppl 1):S14-19.
- Verpy H, Smith C, Reicks M. Attitudes and behaviors of food donors and perceived needs and wants of food shelf clients. *Journal of Nutrition Education and Behavior* 2003;35:6-15.
-

b) Nebraska

- Beretta LM, Koszewski WM, Betts NM, Benes BA. Evaluation of food security and nutrition knowledge of limited resource families. *Journal of Family and Consumer Sciences* 2001;93:46-49.

c) New York

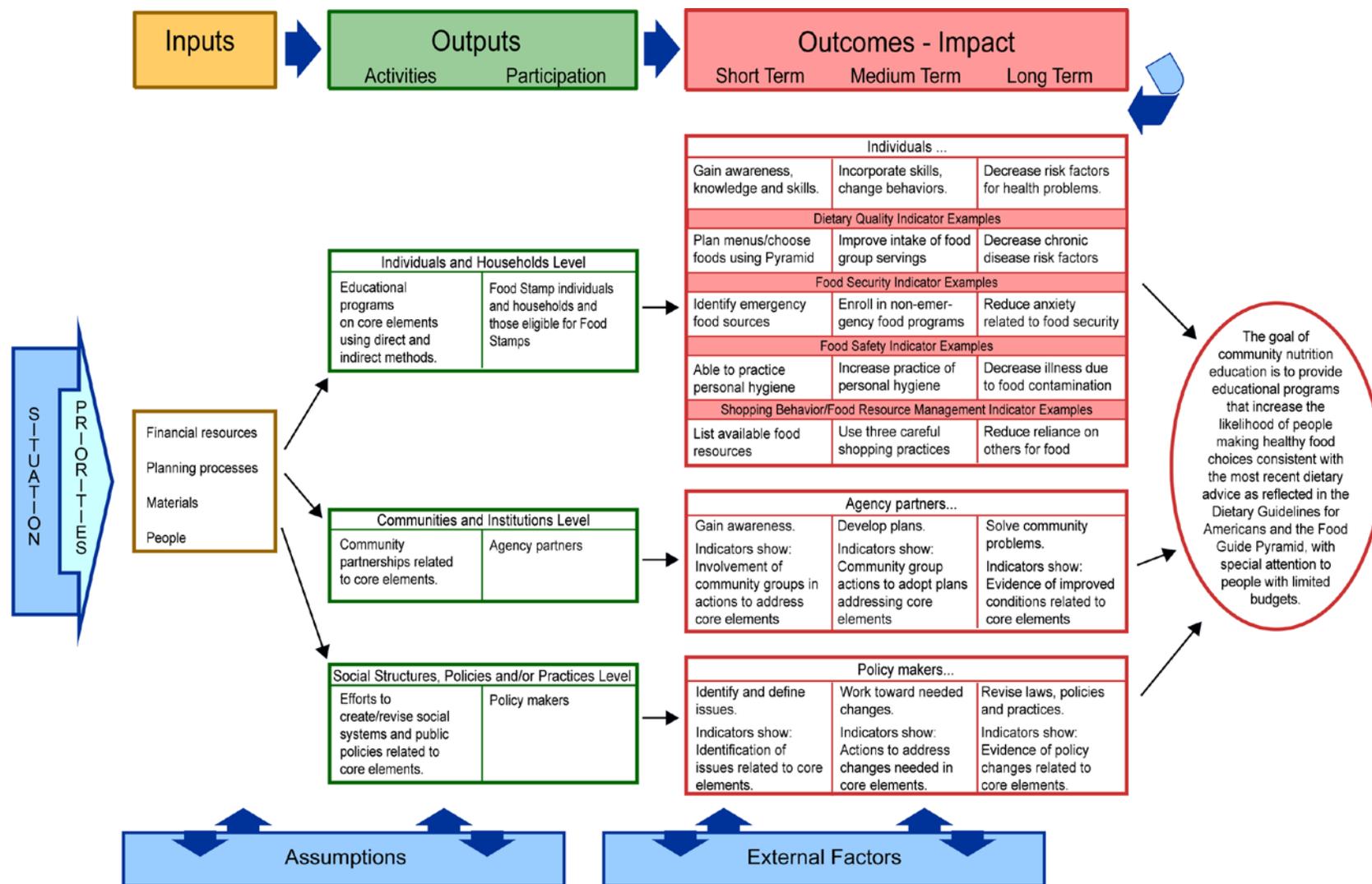
- Dollahite J, Olson C, Scott-Pierce M. The impact of nutrition education on food insecurity among low-income participants in EFNEP. *Family and Consumer Sciences Research Journal* 2003;32(2).

The Community Nutrition Education Logic Model depicts a broad continuum of intervention strategies at the individual/household, community/institution, and social structures/policy levels. The model links these intervention strategies to specific short, medium and long term outcomes.

The committee responsible for developing the Community Nutrition Education Logic Model represented persons involved in a variety of nutrition education programming and funding efforts at the federal, state and local levels. It is hoped that this model will enhance the communication and evaluation efforts of those responsible for delivering nutrition education to our nation's limited income audiences and communities.

The Food Stamp Program, along with other funding agencies, provides significant resources for community-based nutrition education efforts. The Community Nutrition Education Logic Model identifies activities and initiatives that, in some instances, go beyond the intended scope of the Food Stamp Program Nutrition Education (FSNE) grants. The reader should be aware that costs for all of the activities shown on the model are not necessarily allowable as charges to the Food Stamp Program. For more information on State Nutrition Education Plans and FSNE, contact the Food and Nutrition Service (FNS) regional office serving your respective state. Also State Plan Guidance with sets forth specific information on allowable, reasonable and necessary costs can be found at: http://www.nal.usda.gov/foodstamp/program_facts.html#guidance

Community Nutrition Education Logic Model, December 2002



Enhancing Program Performance with Logic Models – Introducing the CNE Logic Model CNE Logic Model

The Community Nutrition Education (CNE) Logic Model – Detail

Inputs
<p>Financial Resources</p> <ul style="list-style-type: none"> • FSNEP Contract (Budget Categories) • Match funds (Public In-Kind and Private Funds) • Non-Match (Private In-Kind) <p>Planning Processes</p> <ul style="list-style-type: none"> • Program Planning • Social Marketing <p>Materials</p> <ul style="list-style-type: none"> • Curriculum • Educational Media • Campaign <p>People</p> <ul style="list-style-type: none"> • Expertise (funded, matched, other) • Accountability: Elected/Appointed Officials • Intra-Institutional Commitment: Membership: Networks, Coalitions, Consortia, etc.

Outputs	
Activities	Participation
Individuals and Households Level	
<p>Conduct education and deliver targeted messages on core elements using the following strategies:</p> <p>Direct Methods</p> <ul style="list-style-type: none"> • Individual/One on One • Small Group • Large Group <p>Indirect Methods</p> <ul style="list-style-type: none"> • Newsletters • News Releases • Kiosks • Internet <p>Media Campaign</p>	<p>Food Stamp individuals/households and those eligible for the Food Stamp Program</p> <p>Direct Methods (# and %)</p> <ul style="list-style-type: none"> ▪ Counted: Gender, Ethnicity, Adult or Youth ▪ Estimated <p>Indirect Methods</p> <ul style="list-style-type: none"> • Counted • Estimated <p>Media Circulation</p> <ul style="list-style-type: none"> ▪ Evidence that participants represent Food Stamp households or those eligible for the Food Stamp Program
Communities and Institutions Level	
<p>Develop/expand community partnerships to identify opportunities and eliminate barriers related to core elements using the following strategies:</p> <ul style="list-style-type: none"> • Community Assessment • Community Awareness Campaigns • Community Organizing • Community Integration of Services 	<p>Agencies/organizations addressing dietary quality concerns which target the Food Stamp population</p> <ul style="list-style-type: none"> • Number of Partnerships by Type, Sector and Level (local, regional, statewide) • Number of Inter-Organization Agreements/MOUs • Number and Description of Community-Based Efforts • Number and Description of Integrated Service Plans

		Social Structures, Policies and/or Practices Level	
		<p style="text-align: center;">Create/revise social systems and public policies related to core elements using the following strategies:</p> <ul style="list-style-type: none"> • Expert review/ comment on federal, state, and/or local public policies • Public Forums • Impact Seminars • Efforts to inform elected officials, food industry leaders (processors and retailers), farmers, educators, and other influential leaders 	<p style="text-align: center;">Systems and policies related to core elements having an impact on the Food Stamp population</p> <ul style="list-style-type: none"> • Number and description of multi-sector efforts that include universities, government agencies, private sector, non-profit agencies and governing/licensing boards • Description of systems and policy change efforts
<i>Enhancing Program Performance with Logic Models – Introducing the CNE Logic Model</i> CNE Logic Model			

Short Term	Outcomes and Indicators	
	Medium Term	Long Term
Individuals and Households Level		
Dietary Quality, Physical Activity Core Element		
Outcomes		
<p><i>Individuals gain awareness, knowledge and skills related to:</i></p> <ul style="list-style-type: none"> • Improved attitudes about healthy eating • Increased knowledge of healthy food choices • Improved skill in selection of healthy foods • Improved skill in preparation of healthy foods • Increased awareness/knowledge of benefits of physical activity (burn calories & control weight, increased stamina, cardiovascular health, reduce risk of cancer, diabetes, improved personal appearance, etc.) • Increased awareness/knowledge physical activity recommendations for health 	<p><i>Individuals incorporate skills; change behaviors related to:</i></p> <ul style="list-style-type: none"> • Increased adoption of healthy food practices • On-going use of healthy weight management practices • Adoption of recommended diet-related practices for disease prevention and management • Participation in regular physical activity • Family/individual participation in physically active community events. 	<p><i>Individuals experience:</i></p> <ul style="list-style-type: none"> • Decreased risk factors for nutrition-related health problems & chronic diseases that are affected by diet and physical activity • Decreased incidence of complications of chronic diseases that are affected by diet and physical activity
Indicators		
<p><i>___% of (x) Individuals who demonstrate ability to:</i></p> <ul style="list-style-type: none"> • Plan menus and choose foods around Food Guide Pyramid (FGP) and Dietary Guidelines (DG) [DQ1] • Adjust recipes and/or menus to achieve certain goals (reduced calories, fat, sodium, etc., or increased nutrients & fiber) [DQ2] • Select/use preparation and storage techniques to conserve nutrients or reduce fat, salt, or to improve taste [DQ3] • Classify foods based on original source (plant or animal) [DQ4] • Write a personal plan to adjust physical activity for health, fitness, weight control, etc. [DQ5] <p><i>___% of (x) Individuals who indicate an intent to</i></p>	<p><i>___% of (x) Individuals demonstrate adoption of healthy eating practices by:</i></p> <p>Improved life style practices based on the food Guide Pyramid & Dietary Guidelines, such as</p> <ul style="list-style-type: none"> • Improved intake of food group servings [DQ8] • Improve intake of selected nutrients and [DQ9] • Improve behavior change related to decreased salt, fat, sugar and calories, or increased servings/variety of vegetables, fruits, whole grains, and low-fat milk [DQ10] • Increased frequency of eating breakfast [DQ11] <p><i>___% of (x) Individuals demonstrate adoption of increased time spent in physical activity practices by:</i></p> <ul style="list-style-type: none"> • Implementation of a personal plan for regular 	<p><i>Individuals show:</i></p> <ul style="list-style-type: none"> • Decreased # of chronic disease risk factors [DQ15] • Decreased # of chronic disease complications [DQ16] • # (%) of food stamp recipients who achieved/maintained healthy weight or lost as much as 5% of body weight (if needed) [DQ17] <p>Note: Studies show that a loss of only 5% of body weight in obese people can bring about beneficial changes in chronic disease risks and/or complications.</p>

Outcomes and Indicators		
Short Term	Medium Term	Long Term
<p><i>adopt one or more healthy food/nutrition practices [DQ6]</i></p> <p><i>__% of (x) Individuals who indicate an intent to begin or increase physical activity [DQ7]</i></p>	<p>physical activity, such as increased time/frequency engaged in daily activity; beginning a specific activity such as walking, hiking, bicycling [DQ12]</p> <ul style="list-style-type: none"> • Increased participation of individual/family in games and play that involve physical activity [DQ13] • Reduction in time spent in sedentary activities (such as watching TV and playing video games) [DQ14] 	
<p><i>Enhancing Program Performance with Logic Models – Introducing the CNE Logic Model</i></p>		

Short Term	Outcomes and Indicators Medium Term	Long Term
Individuals and Households Level		
Food Security Core Element¹		
Outcomes		
<p><i>Individuals gain awareness, knowledge and skills related to</i></p> <ul style="list-style-type: none"> • Knowing what to do when the individual or family has no food and is hungry 	<p><i>Individuals incorporate skills; change behaviors related to:</i></p> <ul style="list-style-type: none"> • Increasing availability of food with reduced hunger 	<p><i>Individuals and households experience:</i></p> <ul style="list-style-type: none"> • A reliable food supply without experiencing hunger
Indicators		
<p>___% of (x) Individuals who demonstrate ability to:</p> <ul style="list-style-type: none"> • Identify emergency food programs (food pantries, soup kitchens, and food banks) and where/how to apply for food assistance [SC01] • Obtain food from emergency food assistance programs to allay hunger [SC02] • Describe non-emergency food assistance community food resources and assistance programs such as food stamps, child nutrition programs and WIC [SC03] • Describe how/where to apply for non-emergency food assistance [SC04] <p>___% of (x) Individuals indicate an intent to adopt one or more beneficial food security practices [SC05]</p>	<p>___% of (x) Individuals demonstrate adoption of practice by:</p> <ul style="list-style-type: none"> • Enrolling in non-emergency food assistance programs (child nutrition, food stamp programs WIC) [SC06] • Relying less on emergency food sources (Food pantries, food banks, soup kitchens) [SC07] • Having fewer hungry days[SC08] 	<p>Individuals and households show:</p> <ul style="list-style-type: none"> • Reduced anxiety related to food security [SC09] • Developed the economic means for food security [SC10] • Families maintain food security over time (based on USDA ERS food security question) [SC11]
Food Safety Core Element		
Outcomes		
<p>Individuals gain awareness, knowledge and skills related to:</p> <ul style="list-style-type: none"> • Practicing personal hygiene • Cooking foods adequately • Avoiding cross-contamination • Keeping foods at safe temperatures • Avoiding foods from unsafe sources 	<p>Individuals incorporate skills; change behaviors related to:</p> <ul style="list-style-type: none"> • Practicing personal hygiene • Cooking foods adequately • Avoiding cross-contamination • Keeping foods at safe temperatures • Avoiding foods from unsafe sources 	<p>Individuals experience:</p> <ul style="list-style-type: none"> • Decreased incidence of disease associated with contamination of food resulting from household food handling practices

Outcomes and Indicators		
Short Term	Medium Term	Long Term
Indicators		
<p>___ % of (x) Individuals who demonstrate ability to:</p> <ul style="list-style-type: none"> • Practice personal hygiene [FS01] • Practice kitchen cleanliness [FS02] • Cook foods adequately [FS03] • Avoid cross-contamination [FS04] • Keep foods at safe temperatures [FS05] • Avoid foods from unsafe sources [FS06] <p>___ % of (x) Individuals who indicate an intent to adopt one or more safe food handling practices [FS07]</p>	<p>___ % of (x) Individuals demonstrate adoption of practice by increasing the number of times they used desirable food handling behaviors associated with:</p> <ul style="list-style-type: none"> • Practicing personal hygiene [FS08] • Practice kitchen cleanliness [FS09] • Cooking foods adequately [FS10] • Avoiding cross-contamination [FS11] • Keeping foods at safe temperatures [FS12] • Avoiding foods from unsafe sources [FS13] 	<p>Individuals show decrease in:</p> <ul style="list-style-type: none"> • ___# of illnesses caused by biological contamination of food (such as bacterial, viruses, parasites) [FS14] • ___# of illnesses caused by chemical contamination of food (such as household cleaners, pesticides) [FS15] • ___# of illnesses caused by physical contamination of food (such as lead contamination, insects) [FS16]

1 There is a strong relationship between Food Resource Management and Food Security. For this logic model, Food Resource Management has been distinguished by what people can do in terms of personal, family and social supports; Food Security has been distinguished by what formal community systems are in place to assist individuals – i.e. emergency and non-emergency food support mechanisms.

Enhancing Program Performance with Logic Models – Introducing the CNE Logic Model

Short Term	Outcomes and Indicators	
	Medium Term	Long Term
Individuals and Households Level		
Shopping Behavior/Food Resource Management Core Element¹		
Outcomes		
<p>Individuals gain awareness, knowledge and skills related to:</p> <ul style="list-style-type: none"> • Identifying personal, family and community resources • Determining the best resource strategies for stretching food resources for self and family • Stretching their food resources • Planning a healthy diet, using low-cost, nutrient dense foods 	<p>Individuals incorporate skills; change behaviors related to:</p> <ul style="list-style-type: none"> • Using a variety of food resources to reduce food costs • Increasing personal/family food availability • Providing culturally acceptable meals that are balanced for cost as well as for nutritional value • Making safe, nutritious, economical food choices away from home 	<p>Individuals experience:</p> <ul style="list-style-type: none"> • Eating nutritiously on a limited budget using resources appropriately
Indicators		
<p>___% of (x) Individuals who demonstrate ability to:</p> <ul style="list-style-type: none"> • List all available food resources (time, money, kitchen equipment, food preparation skills, gardening skills, family and social network supports) [FR01] • Use some careful shopping techniques (shopping plan, shopping list, food price comparisons, coupons, etc.) [FR02] • Compare food costs at different food outlets (grocery stores, farmers markets, restaurants, vending machines, fast food chains, school environment, etc.) [FR03] • Try new low-cost foods/new recipes [FR04] • Evaluate use of convenience foods and prepare some foods from basic ingredients [FR05] • Reduce food waste through proper storage techniques [FR06] • Use the food guide pyramid as a basis for selecting foods [FR07] • Demonstrate the ability to use resources correctly to prepare food (measure food correctly, follow a recipe, use kitchen equipment safely, 	<p>___% of (x) Individuals demonstrate adoption of practice by:</p> <ul style="list-style-type: none"> • Using at least three careful shopping techniques (shopping list, shopping plan, comparing food prices, using coupons, etc.) [FR10] • Using hunting, fishing, gardening, etc. to increase food options [FR11] • Making some foods from basic ingredients [FR12] • Preparing and storing or preserving food for later use [FR13] • Food or food resources lasts to the end of the "month" [FR14] • Using different types of food sources to get nutritional value at best price [FR15] • Consuming more low cost foods [FR16] • Practicing appropriate use of resources in preparing food (measure food correctly, follow a recipe, use kitchen equipment safely, etc.) [FR17] 	<p>Individuals show:</p> <ul style="list-style-type: none"> • Reduce reliance on family, friends, and social support networks for food [FR18] • Ability to stock up on some foods [FR19] • Build and use a food storage system [FR20]

Short Term	Outcomes and Indicators	
	Medium Term	Long Term
etc.) [FR08] ___% of (x) Individuals indicate an intent to adopt one or more beneficial shopping behavior/food resource management practices [FR09]		

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Enhancing Program Performance with Logic Models – Introducing the CNE Logic Model

Short Term	Outcomes and Indicators	
	Medium Term	Long Term
Communities and Institutions Level		
Dietary Quality, Physical Activity Core Element		
Outcomes		
<p><i>Communities/Institutions gain:</i></p> <ul style="list-style-type: none"> • Increased awareness among private and public sector leaders about nutrition-related challenges of low-income households/ individuals • Increased involvement of community groups to address nutrition challenges/issues of low-income households 	<p><i>Communities/Institutions:</i></p> <ul style="list-style-type: none"> • Identify barriers and enhancements to improved community diet quality • Develop and implement plans to improve diet quality • Increased community activities/facilities that encourage physical activity 	<p><i>Improved dietary quality status:</i></p> <ul style="list-style-type: none"> • Leaders/citizens are empowered to solve community food/nutrition challenges • Decreased community barriers to adoption of healthy nutrition practices
Indicators		
<p><i>Communities/Institutions demonstrate increased:</i></p> <ul style="list-style-type: none"> • Composition and # of community groups reporting discussions held on dietary quality challenges of low-income people in that locality [DQ18] • Composition and # of community groups who report a commitment to collaborate on strategies to address dietary quality and physical activity challenges [DQ19] • Composition and # of community groups involved in needs assessment & program planning [DQ20] • Composition and # of community coalitions formed to address dietary quality and physical activity issues of low-income families or individuals [DQ21] 	<p><i>Communities/Institutions exhibit:</i></p> <ul style="list-style-type: none"> • Increased # of referrals of low-income individuals between agencies to facilitate provision of nutrition education [DQ22] • Adoption of a feasible written plan to address challenges and barriers to dietary quality and physical activity by community groups/agencies [DQ23] • Evidence of concrete actions on implementing plan for improving dietary quality [DQ24] • Evidence of concrete actions on implementing plan for encouraging physical activity in a community (such as planned community games and competitions) or development of safe walking/bicycling trails [DQ25] 	<p><i>Communities/Institutions reflect improvements such as:</i></p> <ul style="list-style-type: none"> • More nutritious foods offered in schools or restaurants [DQ26] • Increased availability of certain foods in grocery stores or farmer's markets [DQ27] • Reduced challenges related to transportation of low-income individuals to grocery store, or food stamp and WIC offices [DQ28] • Larger number (percent) of food stamp and low-income individuals who report regular participation in physical activity [DQ29]
Food Security Core Element¹		
Outcomes		
<p><i>Communities/Institutions gain:</i></p> <ul style="list-style-type: none"> • Assess level of food insecurity and factors that limit food security in the community • Increase awareness of food insecurity in the community 	<p><i>Communities/Institutions:</i></p> <ul style="list-style-type: none"> • Develop and implement plans to improve food security • Communities organize to address food security and economic issues that impact food security 	<p><i>Communities are food secure:</i></p> <ul style="list-style-type: none"> • Communities establish an on-going monitoring system to address changes in food security levels in the community • Prevalence of food insecurity decreases

Short Term	Outcomes and Indicators	
	Medium Term	Long Term
<ul style="list-style-type: none"> • Increase involvement of community groups to address food security issues in the community 		
Indicators		
<p><i>Communities/Institutions demonstrate increased:</i></p> <ul style="list-style-type: none"> • Knowledge of levels of food insecurity in the community (based upon the ERS USDA instrument) [SC12] • Composition and number of community groups involved in needs assessment [SC13] • Composition and number of community organizations formed to address food security [SC14] 	<p><i>Communities/Institutions exhibit:</i></p> <ul style="list-style-type: none"> • Adoption of a feasible written plan to address challenges and barriers of food security [SC15] • Composition and number of organized community efforts to address food security [SC16] • Evidence of actions taken to implement plan [SC17] • People in the community donate food, money or volunteer time to emergency food programs and develop a growing support for community anti-hunger programs [SC18] • Emergency food programs have increased quantity and quality of nutritious food [SC19] • Efforts to assess economic conditions such as available employment, housing that impact food security [SC20] 	<p><i>Communities/Institutions reflect improvements such as:</i></p> <ul style="list-style-type: none"> • Fewer families in the community report food insecurity or there are fewer people at the most severe levels of food security [SC21] • Economic indicators improve -- increased education, increased employment, and household income [SC22]

1 There is a strong relationship between Food Resource Management and Food Security. For this logic model, Food Resource Management has been distinguished by what people can do in terms of personal, family and social supports; Food Security has been distinguished by what formal community systems are in place to assist individuals – i.e. emergency and non-emergency food support mechanisms.

Enhancing Program Performance with Logic Models – Introducing the CNE Logic Model

Short Term	Outcomes and Indicators		Long Term
	Medium Term		
Communities and Institutions Level			
Food Safety Core Element			
Outcomes			
<p>Communities/Institutions gain:</p> <ul style="list-style-type: none"> • Increased awareness among private and public sector leaders about food safety related challenges of low-income households/ individuals • Increased involvement of community groups to address food safety challenges/issues of low-income households • Identify hazards that threaten community food safety 	<p>Communities/Institutions:</p> <ul style="list-style-type: none"> • Develop and implement plans based on HAACP to improve food safety 	<p>Improved food safety status:</p> <ul style="list-style-type: none"> • Community establishes monitoring, evaluation and prevention system to address community food safety 	
Indicators			
<p>Communities/Institutions demonstrate increased:</p> <ul style="list-style-type: none"> • Composition and # of community groups reporting discussions held on food safety challenges of low-income people in that locality [FS17] • Composition and # of community groups who report a commitment to work together on strategies to address food safety challenges [FS18] • Composition and # of community groups involved in needs assessment [FS19] 	<p>Communities/Institutions exhibit:</p> <ul style="list-style-type: none"> • Composition and # of organized community efforts to address food safety issues of low-income families or individuals [FS20] • Adoption of a feasible written plan to address challenges and barriers to food safety by community groups/agencies [FS21] • Evidence of concrete actions taken toward implementing plan [FS22] • Increased # of referrals of low-income individuals between agencies to facilitate provision of food safety education [FS23] 	<p>Communities/Institutions reflect improvements such as:</p> <ul style="list-style-type: none"> • Decreased # of food borne outbreaks in the community [FS24] 	
Shopping Behavior/Food Resource Management Core Element¹			
Outcomes			
<p>Communities/Institutions gain:</p> <ul style="list-style-type: none"> • Identify community and institutional barriers and opportunities for improved community food resource management • Increased awareness among private and public sector leaders about food-resource management – related challenges of low-income households/ individuals • Increased involvement of community groups to 	<p>Communities/Institutions:</p> <ul style="list-style-type: none"> • Develop and implement plans to improve food security • Organize to address food resource management 	<p>Improved Food Resource Management status:</p> <ul style="list-style-type: none"> • Increased community initiated efforts to solve food resource management challenges • Decreased community barriers to adoption of effective food resource management strategies 	

Short Term	Outcomes and Indicators	
address food resource management challenges opportunities	Medium Term	Long Term
Indicators		
<p><i>Communities/Institutions demonstrate increased:</i></p> <ul style="list-style-type: none"> • Composition and number of community groups reporting discussions held on food resource management challenges of low-income people [FR21] • Composition and number of people involved in needs assessment [FR22] • Composition and number of organizations formed to address food resource management of low income people [FR23] 	<p><i>Communities/Institutions exhibit:</i></p> <ul style="list-style-type: none"> • Adoption of a feasible written plan to address challenges and barriers to food resource management education [FR24] • Evidence of concrete actions taken toward implementing plan [FR25] • Organized community efforts to address food resource management issues of low income families [FR26] • Increased number of referrals of low-income individuals that receive food resource management education [FR27] 	<p><i>Communities/Institutions reflect improvements such as:</i></p> <ul style="list-style-type: none"> • Nutritious foods are more readily available to low income people [FR28]
<p><i>1 There is a strong relationship between Food Resource Management and Food Security. For this logic model, Food Resource Management has been distinguished by what people can do in terms of personal, family and social supports; Food Security has been distinguished by what formal community systems are in place to assist individuals – i.e. emergency and non-emergency food support mechanisms.</i></p>		

Enhancing Program Performance with Logic Models – Introducing the CNE Logic Model

Short Term	Outcomes and Indicators		Long Term
	Medium Term		
Social Structures, Policies and/or Practices Level			
Dietary Quality, Physical Activity Core Element			
Outcomes			
<i>Educators, media, other public and private representatives hold discussions re: policies, regulations, and industry practices that are barriers to dietary quality</i>	<i>Educators, media, other public and private representatives work toward needed changes in laws, policies and practices</i>	<i>Revision of laws, policies and practices related to dietary quality</i>	
Indicators			
<p><i>Identification and definition of:</i></p> <ul style="list-style-type: none"> • Social/public policy issues/regulations and food industry practices that impact dietary quality and food availability for low-income families/individual [DQ30] • Social/public policy issues and that create barriers to adequate physical activity (example: school policy for children affecting amount of physical activity in school) [DQ31] 	<p><i>Evidence of action such as:</i></p> <ul style="list-style-type: none"> • Number of expressed oral or written commitments to work toward needed changes [DQ32] • Letters, memoranda from legislators, agency heads or food industry leaders that needed changes will be made [DQ33] • Achieved commitment of key citizens, government officials, and policy makers to work toward needed changes in laws, policies, and practices [DQ34] • Adoption of steps that will be taken by policy makers to achieve change [DQ35] 	<p><i>Evidence such as:</i></p> <ul style="list-style-type: none"> • Description of change in structure, policy or practice [DQ36] 	
Food Security Core Element¹			
Outcomes			
<i>Educators, media, other public and private representatives hold discussions re: policies, regulations, and industry practices that are barriers to food security</i>	<i>Educators, media, other public and private representatives work toward needed changes in laws, policies and practices related to food security</i>	<i>Revision of laws, policies and practices related to food security</i>	
Indicators			
<p><i>Identification and definition of:</i></p> <ul style="list-style-type: none"> • Social/public policy issues/regulations and food industry practices that impact food availability for low-income families/individuals [SC23] 	<p><i>Evidence of action such as:</i></p> <ul style="list-style-type: none"> • Number of expressed oral or written commitments to work toward needed changes [SC24] • Number of barriers eliminated to achieving food security (food programs make program applications easier) [SC25] 	<p><i>Evidence such as:</i></p> <ul style="list-style-type: none"> • Description of change in structure, policy or practice [SC27] 	

Short Term	Outcomes and Indicators Medium Term	Long Term
	<ul style="list-style-type: none"> • Letters, memoranda from legislators, agency heads or food industry leaders that needed changes will be made [SC26] 	

1 There is a strong relationship between Food Resource Management and Food Security. For this logic model, Food Resource Management has been distinguished by what people can do in terms of personal, family and social supports; Food Security has been distinguished by what formal community systems are in place to assist individuals – i.e. emergency and non-emergency food support mechanisms.

Enhancing Program Performance with Logic Models – Introducing the CNE Logic Model

Short Term	Outcomes and Indicators		Long Term
	Medium Term		
Social Structures, Policies and/or Practices Level			
Food Safety Core Element			
Outcomes			
<i>Educators, media, other public and private representatives hold discussions re: policies, regulations, and industry practices that are barriers to food safety</i>	<i>Educators, media, other public and private representatives work toward needed changes in laws, policies and practices</i>	<i>Revision of laws, policies and practices related to food safety</i>	
Indicators			
<i>Identification and definition of:</i> <ul style="list-style-type: none"> • Social/public policy issues/regulations and food industry practices that impact food safety [FS25] 	<i>Evidence of action such as:</i> <ul style="list-style-type: none"> • Number of expressed oral or written commitments to work toward needed changes [FS26] • Letters, memoranda from legislators, agency heads or food industry leaders that needed changes will be made [FS27] • Achieved commitment of key citizens, government officials, and policy makers to work toward needed changes in laws, policies, and practices [FS28] • Adoption of steps that will be taken by policy makers to achieve changes [FS29] 	<i>Evidence such as:</i> <ul style="list-style-type: none"> • Description of change in structure, policy or practice [FS30] 	
Shopping Behavior/Food Resource Management Core Element¹			
Outcomes			
<i>Educators, media, other public and private representatives hold discussions re: policies, regulations, and industry practices that are barriers to food resource management</i>	<i>Educators, media, other public and private representatives work toward needed changes in laws, policies and practices</i>	<i>Revision of laws, policies and practices related to food resource management</i>	
Indicators			
<i>Identification and definition of:</i> <ul style="list-style-type: none"> • social/public policy issues/regulations and food industry practices that impact food resource management and food availability for low-income families/individuals [FR29] 	<i>Evidence of action such as:</i> <ul style="list-style-type: none"> • Number of expressed oral or written commitments to work toward needed changes [FR30] • Letters, memorandums from legislators, agency heads, or food industry leaders that needed changes will be made [FR31] 	<i>Evidence such as:</i> <ul style="list-style-type: none"> • Description of change in structure, policy or practice [FR34] 	

Outcomes and Indicators		
Short Term	Medium Term	Long Term
	<ul style="list-style-type: none"> • Achieved commitment of key citizens, government officials, and policy makers to work toward needed changes in laws, policies, and practices [FR32] • Adoption of steps that will be taken by policy makers to achieve changes [FR33] 	

1 There is a strong relationship between Food Resource Management and Food Security. For this logic model, Food Resource Management has been distinguished by what people can do in terms of personal, family and social supports; Food Security has been distinguished by what formal community systems are in place to assist individuals – i.e. emergency and non-emergency food support mechanisms.

Enhancing Program Performance with Logic Models – Introducing the CNE Logic Model

MATERNAL AND CHILD HEALTH PROGRAM

The program area of maternal and child health provides a multidisciplinary area of emphasis with a commitment to a vulnerable population with the overall goal being to improve the health status of women, children and families. The fact that maternal and child health focuses on a specific population rather than a specific discipline, theory or methodology provides both challenges and opportunities. Within the program area of maternal and child health, there are a number of topic areas including, but not limited to, nutrition, minority health, women's health, and children with special needs. The importance of this focus area is documented in the Healthy People 2010 document (See Evidentiary Materials) where there are two overall Healthy People 2010 goals: Goal 1: "Increase Quality and Years of Healthy Life" which focuses on helping individuals of all ages increase life expectancy and improve their quality of life and Goal 2: "Eliminate Health Disparities" which aims to eliminate health disparities among different segments of the population. Healthy People 2010 includes twenty-eight focus areas. One of the focus areas is Maternal, Infant, and Child Health and it has the specific goal "to improve the health and well-being of women, infants, children, and families." The CSREES program area of maternal and child health is recognized by others as pivotal to the overall health of the nation.

Although a majority of the efforts for this program area are found in the classification code KA 703 - Nutrition Education, efforts in this area are also integrated in two other classification codes, KA 702 – Requirements and Function of Nutrients and Other Food Components, and KA code 802 – Human Development and Family Well-being. For the purpose of this report, maternal and child health is included in Portfolio 4.2. The focus of this area is to provide fundamental knowledge supporting behavior change in people's physical and mental status as well as develop and maintain optimal health with an emphasis on maternal and child health. The research topics providing the base of knowledge for these recommendations includes the nutrient requirements and their functions during pregnancy, lactation, infancy and childhood. Research supporting this program area is also concerned with the development of methods to quantify relationships of nutritional status to well-being and to provide a scientific basis for establishing Dietary Recommendations. The interrelationship among KA 702, Requirements and Function of Nutrients and Other Food Components, and KA 802, Human Development and Family Well-Being, can best be demonstrated by recognizing that the research, education, extension and integrated activities carried out under the general theme of maternal and child health emphasize and expand the body of knowledge about the role of different food components and physical activity both isolated from and within a social and emotional construct. A key component of the program area maternal and child health is to maximize the distribution of the research-based knowledge to appropriate audiences, including but not limited to practitioners, researchers, educators, paraprofessionals, the media, consumers and students. The research, education, extension and integrated activities work synergistically to support the Portfolio and CSREES's goal to "Improve the Nation's Nutrition and Health."

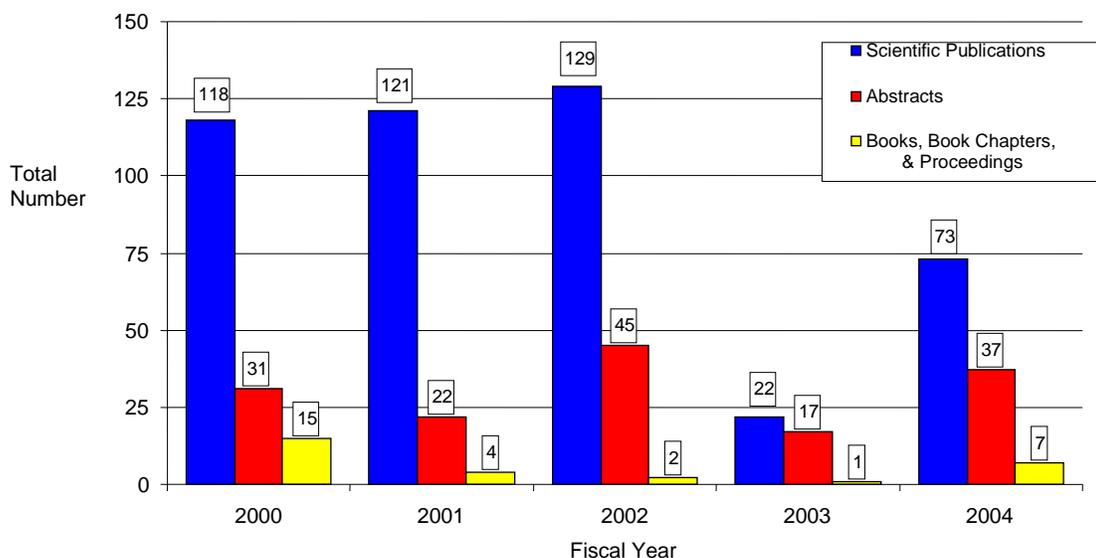
OUTPUTS

Research

The maternal and child health program area is unique within the CSREES system as it is part of a formalized agreement with one of the six federally funded human nutrition centers, the USDA/ARS Children's Nutrition Research Center (CNRC) located at the Baylor College of Medicine in Houston, Texas in cooperation with the Texas Children's Hospital. The CNRC is the first human nutrition research center to conduct scientific investigations into the role of maternal, infant and child nutrition in optimal health, development, and growth. CNRC's eleven-story research facility houses a large live-in metabolic unit, an energy metabolism laboratory, stable isotope and substrate analytical laboratories, a body composition laboratory, an eating behavior observation laboratory, and a plant physiology laboratory. These distinctive facilities enable the center's fifty-

five full-time faculty members to develop multidisciplinary research programs that help improve the nutritional guidelines used by physicians, parents and others responsible for the care and feeding of children. Within the administrative structure of the CNRC, there is a behavioral nutrition unit which emphasizes research on factors impacting behavior changes in target populations. Between 2000 and 2004, over 2500 volunteers have participated in Center studies each year. Volunteers have included pregnant women, breastfeeding mothers, infants, toddlers, preschool children and children within the school setting. The research varies from studies utilizing very precise clinical and metabolic standards to those that emphasize behavior change in the natural environment. Between 2000 and 2004 CNRC research has generated approximately 650 books, book chapters, journal publications and/or abstracts that have the potential to be utilized by professionals in the maternal and child health field. The publication record by year is shown in Figure 24.

Figure 24: Number of scientific publications, abstracts, books, book chapters and proceedings by year from Children’s Nutrition Research Center Scientists



A listing of these publications can be found in the annual reports for the CNRC. (See Evidentiary Materials.) In addition to scientific publications, the results, and, as appropriate, the practical applications, of the research are distributed to professionals by various routes including electronic newsletters, presentations and Web pages. The CNRC Web page can be accessed at www.kidsnutrition.org.

The scope and breadth of these publications demonstrates the importance of the CSREES – ARS partnership in the area of maternal and child health at the CNRC. Through this formalized structure, the research on maternal and child health can be broadly disseminated to a variety of stakeholders. This is further described in the Education and Extension Outputs sections.

Although limited financial resources are targeted specifically within CSREES to maternal and child health, there is a strong level of cooperation in the area of maternal and child health with other CSREES program areas. The National Research Initiative Competitive Grants Program “Improving Human Nutrition for Optimal Health” supported maternal and child health research between 2000 and 2004 and is reported elsewhere in this document. There are also Hatch formula funds devoted to maternal and child health. Although the majority of the Multistate Research Fund projects carried out during 2000 – 2004 did not directly focus on maternal and

child health, a number of the projects have an indirect relationship and provide research results that add to the body of knowledge in this area. Projects carried out under this emphasis area include 1. “Rural Low-income Families: Tracking Their Well-being and Function in an Era of Welfare Reform” (NC-1011), 2. “A Stage-Based Intervention to Increase Fruit and Vegetable Intake in Young Adults” (NC-219), 3. “Parent and Household Influences on Calcium Intake among Preadolescents” (W-1003), and 4. “N-3 Polyunsaturated Fatty Acids and Human Health and Disease” (NC1167).

Extension

The results of research, community intervention activities, and integrated research, education and extension projects are used as a basis for developing and implementing statewide and community-based interventions in the knowledge area of maternal and child health. Research and practical application intervention programs also have been presented to other researchers, educators, and extension professionals in a number of national and international venues including the American Public Health Association (APHA), American Society for Nutrition (ASN), the American Dietetic Association (ADA), the Child and Adult Care Sponsors Association (TSA), the Institute of Food Technologists (IFT), the International Society of Behavioral Nutrition and Physical Activity (ISBNPA), NAASO-The Obesity Society, the School Nutrition Association (SNA) (formerly the American School Food Service Association), the Society for Nutrition Education (SNE), the Society for Research in Child Development, and the State Women Infant and Children (WIC) Directors Annual Meeting. Along with communications to national and international organizations, a number of formal and informal presentations have been made to regional and state organizations on the topic of this knowledge area. In many respects, these regional and state meetings provide an impetus for professionals to work together at the local level. This maximizes the development of the research in this area and offers the potential of a long term positive impact on maternal and child health. In many cases this is where research impacts mothers and children and leads to positive behavior change. As the research is utilized to change behavior, feeding practices and child parent interactions improve.

Within CSREES, faculty and staff with an interest in maternal and child health have served as liaisons with other USDA agencies, specifically Agricultural Research Service (ARS), Center for Nutrition Policy and Promotion (CNPP), and Food and Nutrition Service (FNS). In fact, CSREES faculty and staff throughout the nation implement much of the dissemination of the activities of ARS, CNPP, and FNS. The collaboration is two-way. Other USDA agencies and State institutions utilize CSREES efforts in designing their programs.

Education

The results of research, education, extension and integrated projects expand the knowledge base in maternal and child health. Project results are disseminated to professionals by various routes, including publications, electronic newsletters, presentations, and Web pages.

Graduate and undergraduate education activities are reported in the Higher Education Theme Area. Often research or intervention projects supported by CSREES include financial support for graduate students as well as practicum experiences for undergraduate students. Graduate students are also given the opportunity to present the results of their research at professional meetings such as those listed above under “Extension.” Additionally, many National Program Leaders, State Specialists, and County faculty guest lecture in universities, community colleges and in the high school setting about the topic area of maternal and child health. By providing these educational opportunities for the nation’s youth, interest in maternal and child health as a possible avocation and career choice is encouraged.

Integrated Programs

Because of the closeness of research in maternal and child health to direct application to extension and education, researchers, practitioners and educators funded by CSREES, tend to work in teams. The Multistate Research Fund (MRF) and the NRI “Human Nutrition and Obesity” initiative encourage multistate,

multidisciplinary and multifunctional collaborations on critical issues that have a national or regional priority. Both serve as a mechanism for drawing researchers, educators, practitioners and graduate students together. Specific examples of cooperative multistate research mentioned previously include 1. “Rural Low-income Families: Tracking Their Well-being and Function in an Era of Welfare Reform” (NC-1011), 2. “A Stage-Based Intervention to Increase Fruit and Vegetable Intake in Young Adults” (NC-219), 3. “Parent and Household Influences on Calcium Intake among Preadolescents” (W-1003), and 4. . “N-3 Polyunsaturated Fatty Acids and Human Health and Disease” (NC1167). The specific outcomes from these CSREES supported research projects are described in more detail in the Evidentiary Materials.

OUTCOMES

Short Term

The short term outcomes can be summarized by increased knowledge of stakeholders in the area of maternal and child health.

Medium Term

Based on the short term outcomes, policy makers develop recommendations for the general public. A specific example is that the research carried out at the Children’s Nutrition Research Center on the energy requirements of infants and children led to the energy requirements in the “Dietary Reference Intakes” which then served as the research background for the development of the revised “Dietary Guidelines for Americans” { See Evidentiary Materials}. The expanded knowledge base about maternal and child health is incorporated by educators in the courses they teach and offer to students in the areas of public health, nutrition and child development. Practitioners use the expanded knowledge base about maternal and child health to make recommendations to their target audiences. Researchers use the expanded knowledge base to develop intervention programs targeted to specific audiences that will lead to long-term behavior change.

Long Term

Maternal and child health practices are improved. The incidence of maternal complications during pregnancy is decreased. The prevalence of breastfeeding is increased leading to improved health of the infant and potential health benefits throughout life.

SUCCESS STORIES

- 1) In FY 2003, a three-year NRI grant of \$220,000 was awarded to the University of Wisconsin for a project entitled “Surrogate Measures of Vitamin A Status Using Validated Methods.” The objectives of the project are: 1) to develop a surrogate measure of the modified relative dose response test (a blood test), first using milk from lactating sows and then breast milk from American lactating women, and 2) to apply the surrogate breast milk measures of vitamin A status to Indonesian lactating women known to have a poorer vitamin A status than American women. Pigs were chosen as a model for studying vitamin A human needs for the first objective because they are similar to humans in gastrointestinal anatomy, physiology and vitamin A requirements.
 - a) **Short Term Outcomes:** The investigators have determined that breast milk samples may replace serum to determine vitamin A status in lactating women, but future research is needed in vitamin A-deficient sows and women to determine cutoff values for the modified relative dose response test in breast milk. The investigators are continuing work to determine if the surrogate test can also be used to determine the effectiveness of vitamin A supplementation programs. To date, results from this project have been

presented at Experimental Biology, 2005 and at the XXII International Vitamin A Consultants Group meeting in 2004. Thus far, three journal publications have resulted from this project. One of those journal publications received the First Author Award for Research Papers from the Research Dietetic Practice Group of the American Dietetic Association in Fall of 2005 (Refer to the Evidentiary Materials for more detail).

- b) **Medium Term Outcomes:** Surrogate tests for vitamin A status in lactating women will become available. These tests would be suitable for assessing vitamin A status in situations in vulnerable populations where blood testing is not feasible, e.g., in WIC clinics. Because of the availability of the tests, more information is known about the vitamin A status of low socioeconomic status populations, and this information can be used in revisions of nutrition policy documents, such as ‘Dietary Reference Intakes’ and ‘Dietary Guidelines for Americans’. Educators and practitioners use the updated information to better target vulnerable populations for intervention.
 - c) **Long Term Outcomes:** Because of better assessment data and interventions, the vitamin A status of vulnerable populations (lactating women of lower socioeconomic status and their children) improves.
- 2) In FY 2000, a four-year IFAFS grant of \$1,200,000 was awarded to Colorado State University for a project entitled ‘Premature Birth and Docosahexaenoic Enriched Functional Foods.’ The goals of the project are to determine the amount of docosahexaenoic acid (DHA) that will prevent or reduce premature birth in pregnant women and to provide education to pregnant women and health professionals on how to increase the levels of DHA in their diets so that premature birth does not occur. A double blind dose response clinical intervention trial of supplemental DHA on premature birth and gestational duration has been completed. Patients received nutritional supplement bars providing 0, 300 and 600 mg of DHA per day. The investigators also developed educational materials for a Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) intervention. Eight focus groups were held among women enrolled in the WIC program in Denver, Colorado. The resulting data were used to develop educational materials for the ‘Omega-3 for Baby and Me’ intervention following the principles of the Health Belief Model to address the needs, barrier, and motivators of this audience. The use of focus groups and pilot testing increased the target audience acceptance of educational materials.
- a) **Short Term Outcomes:** The investigators found a significant 4-day increase in gestational length in the intervention groups as compared to controls. The nutrition education intervention (without DHA supplementation) was found to be as effective as the intervention with the functional food supplement. A small increase in birth weight (60 g) was also found in the intervention groups. Although this increase was not statistically significant, it compares favorably with current WIC intervention evaluation data, which shows participation in the WIC program leads to a 1 oz. increase (about 30 g) in birth weight.
 - b) **Medium Term Outcomes:** Information obtained from the clinical trial can be used to formulate dietary recommendations and supplemental food products for pregnant women. The tested ‘Omega-3 for Baby and Me’ educational materials are being made available for use in WIC clinics around the country.

Figure 25



- c) **Long Term Outcomes:** Because of the dietary interventions targeting pregnant women and the availability of DHA-enriched food products in the market, the incidence of premature delivery in the U.S. could be decreased.
 - d) **Impact:** Results of this project can lead to a decreased incidence of premature delivery in the U.S., significantly improving infant health and reducing health care costs.
- 3) Research from the Children’s Nutrition Research Center (CNRC) and other topics of interest pertaining to maternal and child health are effectively distributed through a cooperative venture between CNRC and CSREES. The quarterly electronic and hardcopy maternal and child health newsletter, “Nutrition and Your Child” has a distribution list of over 10,000 through the CSREES Lyris listserv and a hard copy mailed distribution of greater than 3000. The ability for both audiences to receive the information simultaneously is an asset. The newsletter provides practitioners and the public with the research-based information for maternal and child care based upon research. Practitioners and the general public are given an opportunity to sign up for the electronic version of the publication at professional development meetings and on the CNRC Web site at www.kidsnutrition.org. The award-winning quarterly consumer-oriented newsletter is also posted on the CNRC website which has earned an “Among the Best” rating from Tufts University’s Nutrition Navigator. Numerous letters of thanks and requests for adaptation and use of the information material from the newsletter have been received.

Figure 26

LESS SCREENTIME AND MORE PHYSICAL ACTIVITY LEADS TO HEALTHIER WEIGHT

TV viewing and lack of physical activity are major predictors for overweight (body mass index (BMI) ≥ 95%) in children between 3 to 7 years of age. Research conducted at the Children's Nutrition Research Center (CNRC) suggests that ages 6 and 7 may be a critical time when TV viewing and physical activity have the greatest impact on BMI.

A study following 3- to 4-year-old children from White, Hispanic and African American families for three years was published in the April 2005 issue of the *International Journal of Obesity*. TV viewing time and physical activity were assessed by direct observation of the children.



Dr. Tom Baranowski, a behavioral scientist at CNRC and collaborator on the research project, acknowledged that determining causes for obesity is a complex issue. Obesity results from an energy imbalance when calorie consumption exceeds energy expenditure. He added, "Physical activity is

one of the activities we can encourage. Too much TV time can decrease the time available for physical activity." Since TV viewing has been associated with consumption of soda, fried foods and snacks, the relationship between TV viewing and the increased presence of overweight could also be related to children making poor dietary choices while watching television. Interestingly, as the children became older the relationship between overweight and TV viewing became stronger.

He concludes, "When parents or caregivers focus on reducing the time spent watching television and increasing the time spent in physical activity, they may be successful in preventing obesity among young children."

The American Academy of Pediatrics in their message for parents suggests that:

- ♦ parents should limit their child's use of TV, movies, and video and computer games to no more than one or two hours per day
- ♦ parents should not let children watch TV while doing homework, and
- ♦ parents should not put a television in their children's bedrooms.

For additional information on the American Academy of Pediatrics position, visit the media section of their website at <http://www.aap.org/healthtopics/mediasave.cfm>.

BE A "HEALTHIER YOU" BY FOLLOWING THE NEW USDA FOOD GUIDANCE SYSTEM

The new symbol and interactive food guidance system from the USDA, MyPyramid, can help you live a longer, better and healthier life. MyPyramid emphasizes the need for an individualized approach to improving diet and lifestyle. Check it out in both English and Spanish at the website www.Mypyramid.gov.

The Web site can help you learn about nutrition as you choose the foods and amounts that are right for you. Advice found "inside MyPyramid" can help you

- ♦ Make smart choices from every food group,
- ♦ Find your balance between food and physical activity, and
- ♦ Get the most nutrition from your calorie choices.

MyPyramid is about the ability of Americans to personalize their approach when choosing a healthier lifestyle that balances nutrition and exercise. According to Dr. Marilyn Swanson, National Program Leader for Maternal and Child Health, stationed at CNRC, "Many Americans can dramatically improve their overall health by making modest improvements to their diets and by incorporating regular physical activity into their daily lives."

MyPyramid follows recommendations from the 2005 Dietary Guidelines for Americans which provide authoritative advice for people two years of age and older about how proper dietary habits can promote

(Continued on page 2)

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 Self Worth Through Feeding Styles 3

The quarterly newsletter, "Maternal and Child Health Links" is designed for professionals in the field. The current electronic mailing list also on the CSREES Lyris listserv includes over 700 names of professionals who have registered to receive the electronic newsletter.

NEW DIRECTIONS

Maternal and child health will remain a major program that has the opportunity to impact the future health, with particular emphasis on the underserved or at-risk sectors, of our nation. With the increased interest in obesity prevention, additional efforts will be directed to practices that may change behavior of our nation's youth leading them to a healthier lifestyle as they become older. Efforts will be made to obtain and quantify the impact of CSREES training programs conducted through the state and at local levels that prove successful in providing healthier lifestyles and eating patterns for the mothers, infants and children. Continued cooperation with the Children's Nutrition Research Center (CNRC), both in the practical application of research that is conducted and information from the CSREES family of practitioners to the CNRC staff, will facilitate the development and implementation of grant proposals and research efforts that are practical and applicable to a changing population. A more structured feedback process from extension professionals in the field to researchers at CNRC can reinforce the critical areas where research-based information is needed by the public.

EVIDENTIARY MATERIALS

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Butte NF, Wong WW, Treuth MS, Ellis KJ, O'Brian Smith E. Energy requirements during pregnancy based on total energy expenditure and energy deposition. *Am J Clin Nutr* 2004; 79:1078-1087.

Brooks GA, Butte NF, Rand WM, Flatt JP, Caballero BH. Chronicle of the Institute of Medicine physical activity recommendation: how a physical activity recommendation came to be among dietary recommendations. *Am J Clin Nutr* 2004; 79:921S-930S.

Butte NF, Treuth MS, Mehta NR, Wong WW, Hopkinson JM, Smith EO. Energy requirements of women of reproductive age. *Am J Clin Nutr* 2003; 77: 630-638.

Dietary Guidelines for Americans (need rest of citation)

Dietary Reference Intakes (from National Acad. of Science) (need rest of citation)

Healthy People 2010 (need rest of citation)

Penniston, K.L. and S.A. Tanumihardjo. 2005. Elevated Serum Concentrations of β -glucuronide Metabolites and 4-oxoretinol in Lactating Sows After Treatment With Vitamin A; a Model for Evaluating Supplementation in Lactating Women. *Am J. Clin. Nutr.* 81:851-858 [NOTE: This paper has been nominated for best paper of 2005 by a member of the American Dietetic Association's Research Dietetic Practice Group].

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USDA-ARS Children's Nutrition Research Center Annual Report FY2002

USDA-ARS Children's Nutrition Research Center Annual Report FY2003

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Valentine, A.R. and S.A. Tanumihardjo. 2005. One-time Vitamin A Supplementation of Lactating Sows Enhances Hepatic Retinol in their Offspring Independent of Dose Size. *Am. J. Clin. Nutr.* 81:427-33.

COMMUNITY FOOD PROGRAM

Community food security is an interdisciplinary, community based effort to solve problems of food access. It is, by its nature, broader in definition than the scope of KA 704. Local involvement in production and marketing of food, and environmental stewardship are key interdisciplinary aspects to the community food security work. CSREES land grant university partners are frequently involved through community organization, food assessment, research on the prevalence of hunger, evaluation of projects and, in some cases, actual project leadership. Community Food Projects align well with other CSREES efforts in providing food and nutrition education to low-income citizens.

The community food program (CFP) is grounded in the concepts of "community food security." Community Food Security grew out of a philosophy promoting proactive approaches to hunger rather than relying only on food distribution, charity models of increasing food access for low-income people. Community food security is defined as a condition in which all community residents obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes community self-reliance and builds social capital. It augments and broadens work of CSREES programs to "Improve Individual, Family and Community Nutritional, Health, Fitness and Well-Being," by encompassing integrated projects that include environmental stewardship, socio-economic development, food access and food production, and good nutrition through promoting community self-reliance over their food systems.

CFP, through its competitive grants program, addresses a broad range of community food security problems affecting the food system, community development, and the environment such as increasing poverty and hunger, disappearing farmland and family farms, inner city supermarket redlining, rural community disintegration, rampant suburban sprawl, and air and water pollution from unsustainable practices. A community food security approach seeks to build a community's food resources to meet its own needs. These resources may include, among others, supermarkets, farmers' markets, gardens, transportation, community-based food processing ventures, and urban and rural farms.

Concerns about the extractive nature of American agriculture, have led the community food security approach to focus food production efforts on sustainable agriculture practices to add environmental stewardship as an integral part of food production. A stable local agricultural base is an agricultural system that does not deplete local land resources. Rather it handles and uses the land in ways that ensure productive land into the future. A stable local agriculture system is key to a community responsive food system. Farmers need increased access to markets that pay them a decent wage for their labor, and farmland needs planning protection from suburban development. By building stronger ties between farmers and consumers, consumers gain a greater knowledge and appreciation for their food source.

Community Food Projects Competitive Grant Program (CFPCGP) is a program of the CFP that funds community food security projects. Eligible entities are low-income communities, non-profit organizations, which have been linked with more traditional CSREES partners, and the local Cooperative Extension Service offices. Projects that are funded use a proactive approach to combating hunger. Funded projects develop community solutions to food access issues, which increase the self-reliance of the community over their food systems and promote the basic tenants of community food security.

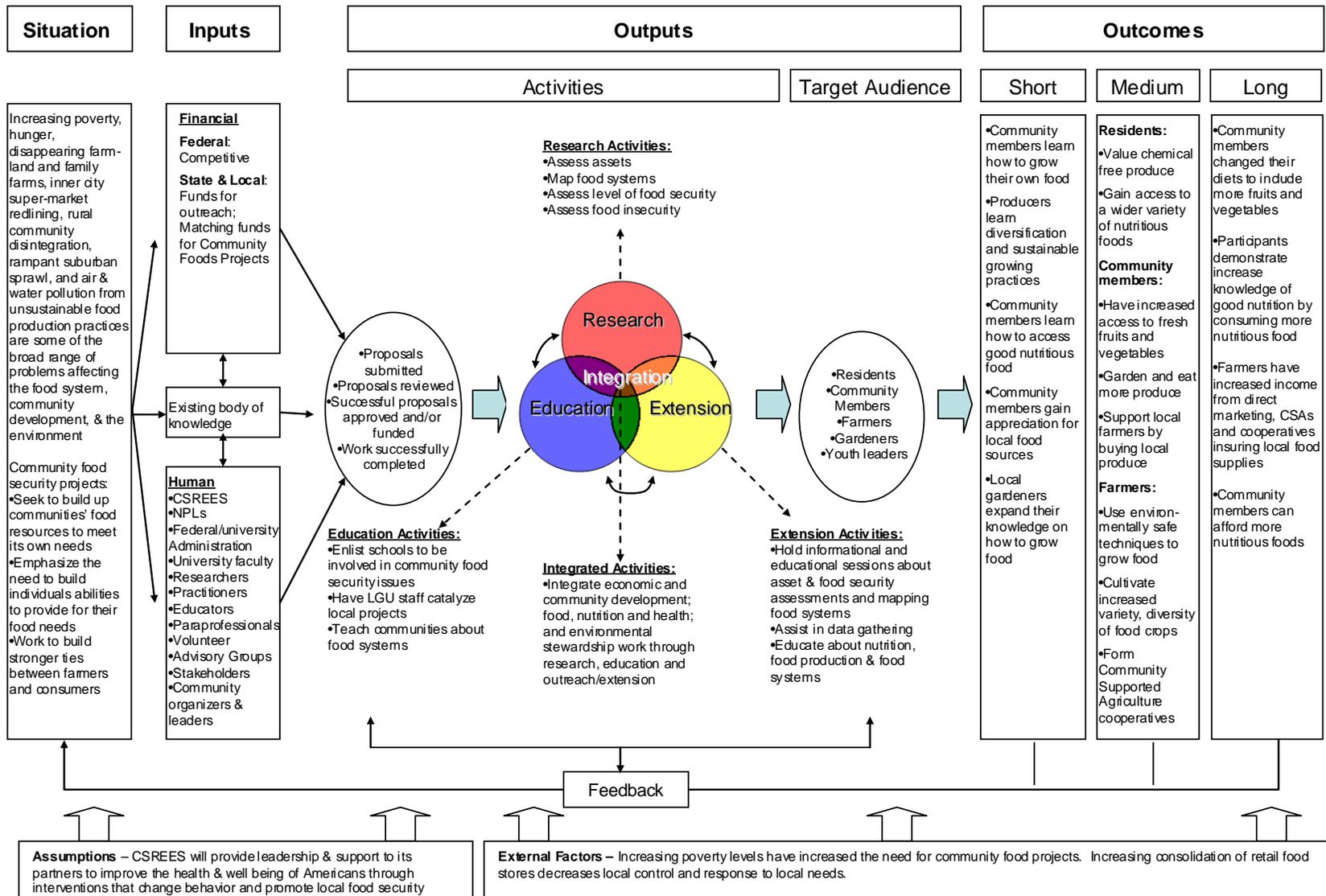
The authorizing legislation of the CFPCGP is Section 25 of the Food Stamp Act of 1977, as amended by Section 4125 of the Farm Security and Rural Investment Act of 2002 (Pub. L. No. 107-171) (7 U.S.C. 2034), authorizing a program of Federal grants to support the development of Community Food Projects. During the 2000-2004 time period of this self-study approximately \$20 million dollars went into communities for

Community Food Projects. Community Food Projects promote community nutritional health, fitness and well-being through community-based initiatives that improve the quantity and quality of community food systems improving the food environment as a means to improve nutritional well being.

The CFPCGP has funded 211 community food security projects since its inception in 1996. During the time specific in this self-study, 2000-2004 approximately 170 grants were funded under this grant program. Because sustainability of these projects is an important focus of this program, some successful projects have provided data beyond their funding period, which is included in the self-study timeframe.

The next figure is the CES logic model. It highlights the outputs and outcomes of the program and attempts to show graphically how these pieces operate together to improve the situation.

Portfolio 4.2 – Promote Healthier Food Choices and Lifestyles: Community Food Programs



INPUTS

Table 20: Funding for KA 704 – Community Food Projects

Sources of funding	Fiscal Year (<i>in thousands</i>)					Total
	2000	2001	2002	2003	2004	
CSREES	\$2,300	\$2,300	\$4,600	\$4,600	\$4,600	\$ 20,700
Other Match	\$ 2,300	\$2,300	\$4,600	\$4,600	\$4,600	\$ 20,700
Total	\$4,600	\$4,600	\$9,200	\$9,200	\$9,200	\$41,400

Funding for the Community Food Projects Competitive Grant Program was \$2.5 million in years 2000 and 2001. It is funded out of the Food Stamp program and is mandatory money once Food Stamps are appropriated. The 2002 farm bill doubled the budget to \$5 million each year. There is a dollar-for-dollar match required for each project, thus the CSREES funds that reach the community are doubled for project work to approximately \$10 million dollars per year. The match requires communities with projects to engender community support for the community food security work. Match may be in-kind, as well as cash. The match requirement increases the commitment of communities to the community food security projects, but can disadvantage poor communities with few sources of non-Federal match.

OUTPUTS

Community food projects vary as much as their communities. The most important aspect of beginning a community food project is the assessment of the community's food system. This ensures projects come from the community, not from the outside. In other words, stakeholders develop the projects. The philosophy of community food security emphasizes looking at a community's assets first and discerning needs through the total community assessment. Communities are self defined; sometimes being a neighborhood, sometimes a town or city, sometimes a region.

Community members are involved in mapping their community's sources of food; grocery stores, farmer's markets, corner convenience stores, food pantries, gardens, farms, etc. Important information is gleaned by examining transportation issues. Low income community members often need direct transportation to reach food outlets which are frequently located at great distances from their homes. Assessments of assets and maps of food systems are important outputs for this work. Economic assessments of where food dollars are spent can illustrate to low-income communities their ability to significantly impact their local economy by how they chose to spend their financial resources including food stamp dollars. Assessments teach the community what resources are available and which need to be improved.

In addition to assessing a community's food environment, household food security is assessed through tools like the survey tools available through the Economic Resource Service <http://www.ers.usda.gov/Briefing/FoodSecurity/surveytools>. The focus in hunger research has long been on individual household food security. Assessments of household food security, and community assessment can help communities assess their need for Federal food assistance programs such as food stamps, school lunch, adult and child nutrition programs, WIC, etc. Learning the level of food insecurity triggers resources available to improve food security.

Community food programs promote the food security in low-income communities by integrating the needs of all citizens in communities for local, healthy, sustainable food sources. Programs promote awareness of the food system, especially among young people, who tend not to understand that food comes from sources other than retail stores. Knowledge gained from learning about food systems makes citizens into better consumers.

Integral to the success of community food programs is economic and community development, food, nutrition and health, and environmental stewardship. Community food projects interact with diverse disciplines including sustainable agriculture, rural and urban community and economic development, planning, teaching, and faith-based professionals.

OUTCOMES

Short Term

Community Food Projects are designed to assess the food system in communities to establish a base line for understanding the food security within the community. Strategies to build food security lead to diverse solutions. Community members learn how to access good, nutritious food. Community members learn how to grow their own food, how to set up farmers' markets, how to organize cooperative grocery stores and buying clubs, and access better food assistance through WIC, food stamps, food banks, etc. Food access and environmental stewardship is enhanced as producers.

Producers learn diversification and sustainable growing practices, they learn how to set-up entrepreneurial enterprises as they start "Community Supported Agriculture" programs. Community members learn how to access good nutritious food. Community members gain appreciation for local food sources and participate in CSAs and Farmers' Markets. Local gardeners know how to grow food and get involved in growing food for sale, or for donation through food banks or other means.

Medium Term

By becoming educated about local food systems and environmental stewardship, residents learn to value chemical free produce and support local food enterprises both to improve their diets and to build wealth within their community. As more produce is produced in the community, community members support local farmers by buying more produce.

Community members have increased access to fresh fruits and vegetables. More community members garden and eat more produce from their gardens. Community members support local farmers by buying produce. Local farm lands grow food using environmentally sensitive techniques and preserve farmland for future generations. Farmers cultivate increased variety, diversity of food crops, ensuring the health of the land and the community members. Local farmers form Community Supported Agriculture cooperatives. Residents gain access to a wider variety of nutritious foods

Long Term

As fresh produce becomes available and residents are involved in growing food, community members change their diets to include more fruits and vegetables. Residents learn about nutrition and participants demonstrate increased knowledge of good nutrition by consuming more nutritious food. Farmers have increased income from direct marketing, CSAs and cooperatives insuring local food supplies that are both available, and improve the nutritional content of local diets. Community members can afford more nutritious foods through growing their own food, food buying clubs, WIC farmer's market coupons and community gardens.

SUCCESS STORIES

- 1) "The Anahola Self-Sufficiency Program on Hawaiian Homelands, " Kauai Food Bank, Lihue, Hawaii, was funded at \$79,000 for two years to establish a farm to produce foods for local consumption. The project was driven by the need to provide food for the food bank, which was very expensive as it was all imported from the mainland. Their farm was a result of the policy of corporations returning native Hawaiian land to the people, so their initial goal was to develop a farm that could provide local food. This farm's second goal was to grow enough food to earn enough income for the farm to continue to provide food for food bank recipients. An unexpected outcome was that they were seen as competitors of local farmers, so they developed a brokerage business to help local farmers gain access to restaurant and hotel markets for their food.

Their goal of producing a viable supply of local food has been exceeded. Their goal that evolved into a food brokerage has also grown in the years since the initial funding was secured. The impact of this project is extensive. The island of Kauai has had their community food security sustainability improved for the long run through this small project, by creating local, organic healthful produce for Food Bank recipients, visitors and other consumers and creating an economic base for local farmers.

- a) **Short term Outcome:** A farm was developed that successfully created a segment of the food system that provided food for food bank recipients and a market outlet for local farmers. At the end of their second year, food bank revenues had increased by 20% and helped broker dozens of farmers' produce.
 - b) **Medium Term Outcome:** Many more farmers were successfully able to provide local food, earn a livelihood and increase their own access to nutritious food. In 2001 the Food Bank purchased \$400,000 worth of food from fifty-seven local farmers and sold to sixty-three local hotels and restaurants, five grocery stores and the local hospital.
 - c) **Long Term Outcome:** The island of Kauai has increased access to locally grown, nutritious produce and has increased economic viability as local farmers provide more food for local residents, restaurant and the hospital.
- 2) "Tohono O'odham Community Food System," Tohono O'odham Community Action. Grantee was funded at \$135,000 for three years. Community Food Project funds have been used by this organization to promote the return to traditional food culture practices through cultivation and collection of food. The project includes food production, gathering, processing, distribution, and education and traditional cultural activities.
 - a) **Short Term Outcome:** Equipment purchased under the grant allowed them a 275% increase in cultivated acreage, in the third year of the grant a no-cost five year lease of an 1100 acre farm was added to their resources.
 - b) **Medium Term Outcome:** Traditional seeds were saved and distributed to forty families in addition to stockpiling some for the farm. A five day bahidaj (saguaro fruit) gathering camp yielded 300 volunteer hours. Drought limited the yield gathered, but the project increased the production and collection of wild foods by 500% in year three of the grant.
 - c) **Long Term Outcome:** A major focus of changing the food system environment was to improve the diet of the Tohono O'odham people in order to reduce the incidence and severity of the Diabetic epidemic among the people. Data will be collected in the future on this impact.

- 3) “Healthy Harvest: Building Boston’s Food Security From the Ground Up,” The Food Project, Inc., Lincoln, Massachusetts, was funded at \$150,000 for two years and a one year extension.

This project’s goal was to demonstrate the viability of a sustainable metropolitan food system by linking food production with youth and community-based enterprises, while also imparting healthy food production and consumption skills to youth and urban neighbors by teaching and modeling skills in land remediation, culinary arts and nutrition.

- a) **Short Term Outcome:** The project taught youth environmental remediation techniques and transformed an urban lot into a site that grows specialty niche crops.
 - b) **Medium Term Outcome:** Through the development of gardens, and a community commercial kitchen, youth were involved in researching and developing a youth-involved food service enterprise that developed and marketed salsa.
 - c) **Long Term Outcome:** In year three of the project the youth-involved enterprise adding value to niche crops sold 2,200 units of salsa through ten stores and through a Community Supported Agriculture program. This created a viable food enterprise, increased food growing, processing skills in youth and local residents and improved the food system in the local area.
- 4) “Break-through Food Security Project, “ Missouri Rural Crisis Center, Columbia, Missouri, funded at \$195,000 for three years in 1998 and funded in 2000 for \$110,000 for two years.

These projects focused on first establishing viable markets for a cooperative of small family pork producers, Patchwork Family Farms. The farmers were committed to the humane treatment of their animals, responsible environmental stewardship of their land and economic development of their cooperative. They were looking for markets to reach into low-income communities, while still gaining adequate income from their animal production. The success of the initial marketing efforts led to another project that increased the food processing capacity of the region as this cooperative sought to sell more pork by making sausage in addition to the higher end cuts purchased by restaurants and grocery stores.

- a) **Short Term Outcome:** African American urban Churches in Kansas City and St. Louis gained access to humanely raised pork products from Patchwork Family Farm Cooperative, increasing their access to food.
- b) **Medium Term Outcome:** Small family farmers increased their income and ability to keep their farming operations in business. A food processor was given local business allowing his food processing facility to provide regional food for residents.
- c) **Long Term Outcome:** A viable food system is successfully continuing to provide sustainability grown food in a region and improving food access, while contributing to environmental stewardship and economic development in the region.

NEW DIRECTIONS

The community food projects funded under the CFPCGP are learning laboratories for creating alternative food systems in the United States across the country. While not replacing the prevailing global food system, it creates the opportunity for viable local food enterprises that energize local economies, create food access in low

income communities and sustain environmentally sound local food production for homeland security. A special interest is to involve more children and you in the projects to teach them new models for their relationship to food production.

4-H YOUTH DEVELOPMENT PROGRAM

The 4-H Youth Development program—the flagship youth development program of the U.S. Department of Agriculture--was founded over 100 years ago to create educational opportunities for youth in rural communities. Today, 4-H Youth Development connects over 7 million young people--ranging from rural to urban settings and on military installations around the world --to the land-grant universities' research, extension, and educational programs. As with other professionals, youth development has been built on a body of research, program theory, and application that have converged to build the foundation for 4-H youth development programs. Youth Development educators, in partnership with young people, adult volunteers and Extension faculty provide leadership for the assessment, design, implementation and evaluation of programs in their local community settings.

4-H Youth Development is dependent upon a complex network of federal, state, and local partnerships with young people at its core. CSREES and the Cooperative Extension System have the capacity to provide strategic leadership and programmatic direction for 4-H youth development programs. Because of their ties with the Land Grant University system and their ability to leverage resources at the local, state and national levels, 4-H Youth Development is uniquely positioned to educate stakeholders about the conditions and environments in which young people learn and grow best and collaborate with other agencies and institutions to advance the field of youth development for positive youth outcomes.

Healthy Lifestyles (which includes nutrition and physical activity) is one of three current priority program areas for 4-H, along with Citizenship and Science, Technology, Engineering, and Math. In addition, developing the “Health H” in young people, along with the other three developmental areas of “Head, Heart, and Hands,” provides the foundation for the 4-H Youth Development program.

Nutrition and Health Specialists located on land grant university campuses, work in partnership with Youth Development Specialists and county based youth development and family and consumer science faculty and staff to train youth, and the adults who work with them, in nutrition, health, and food safety principles and practices. In addition, food security issues are addressed through 4-H with several programs conducting community service projects related to food recovery and gleaning, collecting food for food pantries and homeless shelters. The 4-H Youth Development program, its’ “sister” programs--Expanded Food and Nutrition Education Program (EFNEP) and the Food Stamp Nutrition Education Program (FSNEP)--work towards very similar nutrition and health outcomes for youth.

The 4-H Youth Development mission states that “4-H empowers youth to reach their full potential working and learning in partnership with caring adults.” During 2001 – 2005, 4-H reached 34.6 million young people, with the support and commitment of 2.9 million adult volunteers across the United States. It is estimated that 4-H reaches 23% of youth across America sometime between K-12 grades.

Within the 4-H program, young people learn a variety of subjects through “hands on,” or experiential education processes, in a variety of program settings. Some include:

- ✓ completing individual, self-paced project books with the guidance of an adult volunteer
- ✓ classes, including supporting materials and activities, presented in group settings such as after-school programs, day-camps, resident camps, project clubs and formal classrooms
- ✓ educational activities such as team recreational and sports activities, science experiments, mentoring, tutoring, contests, judging, and skill-a-thons

Young people can learn about a variety of subjects in the following broad categories:

- ✓ Citizenship and Civic Education
- ✓ Communications and Expressive Arts
- ✓ Consumer and Family Science
- ✓ Environmental and Earth Sciences
- ✓ Healthy Lifestyles Education
- ✓ Personal Development and Leadership
- ✓ Plants and Animals
- ✓ Science and Technology

In the area of Healthy Lifestyles, the following numbers of young people were reported in 2003 in the Federal 4-H enrollment reporting system

[http://www.reeis.usda.gov/portal/page?_pageid=37,178240&_dad=portal&_schema=PORTAL&smi_id=31:](http://www.reeis.usda.gov/portal/page?_pageid=37,178240&_dad=portal&_schema=PORTAL&smi_id=31)

Healthy Lifestyle Education	2,376,907
Foods and Nutrition	1,006,469
Food Safety	421,970
Fitness and Sports	111,338
Physical Health	35,148

There are two national systems in which 4-H Curriculum—on a broad array of topics—is produced and reviewed against pre-established national criteria. The 4-H Cooperative Curriculum System (4-HCCS) engages design teams from across the country in the development, evaluation and dissemination of nationally juried 4-H curriculum. Out of the 180 curriculum products in the 2005 collection, the following seventeen products focus on nutrition and health: Consumer Savvy (grades 3-12), four part series; Foods (grades 3-12), five part series; and Health (grades 3-12), three part series.

The National 4-H Juried Collection is a collection of curricula that has been developed, piloted, evaluated, and peer reviewed by university faculty. In 2004, of the approximately 150 different curricula in the collection, the following twenty-two (or 15%) nutrition and health curricula for youth were listed: In Touch Science: Foods and Fabrics; Cycling Back to Nature: Food Production and Pesticides; Health...It's Your Choice; Fantastic Foods; Eatfit; Food, Fun, and Reading; Foods Leader's Guide; Food Science; Gifts of Gold; Getting Into a Food Mood; In the Bag! Families Sharing Science Together; Our Heritage in Foods; Rising to the Occasion; Sports Nutrition; Youth Curriculum Sourcebook; Tricks for Treats & More Tricks for Treats; Growing Connections: A Garden-Enhanced Nutrition Education Curriculum; S'Mores and More: Outdoor Cooking; Outdoor Adventures; Kitchen Science for Kids; Breads of the Harvest.

OUTCOMES

Short Term

Youth will gain knowledge/attitudes in:

Nutrition

Youth know how to choose foods according to Pyramid.

Youth know how to choose food with less fat or sugar.

Youth can name Pyramid food groups and/or can identify foods in each group.

Youth know how to choose healthful snacks and/or beverages.
Youth have an increased awareness of career opportunities in nutrition and health industries.
Youth know how to set personal goals to maintain appropriate daily nutritional intake.

Physical Activity

Youth know the benefits of physical activity and how to include it in life.
Youth know how to set personal goals to become and remain physically fit.

Food Safety

Youth know how to wash hands properly.
Youth know how to keep kitchen area clean.
Youth know how to avoid cross-contamination.
Youth know how to keep foods at safe temperatures.
Youth know how to avoid foods from unsafe sources.

Food Preparation

Youth know how to follow recipes correctly and safely.

Medium Term

Nutrition

Youth eat near to recommended amounts of fat/sugar/calories.
Youth increase frequency of eating breakfast.
Youth eat near to recommended amounts from Grain group.
Youth eat near to recommended amounts from the Fruit and/or Vegetables groups.
Youth eat near to recommended amounts from Milk group.
Youth eat near to recommended amounts from Meat & Bean group.
Youth eat near to recommended Pyramid amounts.
Youth make healthful choices for snacks and/or beverages.

Physical Activity

Youth engage in regular physical activity (biking, hiking, sports).
Youth increase participation in physically active games and play.
Youth reduce time spent in sedentary activities.
Youth are physically active at least 60 minutes each day.

Food Safety

Youth wash their hands properly and when necessary.
Youth keep the food preparation work area clean.
Youth handle foods to avoid cross-contamination.
Youth keep foods at safe temperatures.
Youth avoid foods from unsafe sources.

Food Preparation

Youth make nutritious foods from basic ingredients using recipes

Long Term

- ✓ The human capital of communities will be improved because chronic disease that is caused, in part, by poor nutrition, physical inactivity, and obesity, will be reduced.
- ✓ The human capital of communities will be improved because people will live longer and be healthier.
- ✓ The economic capital of communities will be improved due to decreased spending on health care conditions.

SUCCESS STORIES

Programs of Excellence

Between 2000 and 2003 states were asked to submit a representative sample of their most outstanding 4-H programs, focused on a variety of topics and outcomes, to a national collection, called the Programs of Excellence. In 2000 the total number of programs in the collection was fifty-five with five focused on food security, food safety, nutrition and physical activity; in 2001 there were 150 programs with thirteen focused in the same areas, and in 2002 the number was 167 programs with eight focused in the same areas.

1) Maryland: Kitchen Science—Activities Combining Food Science and Nutrition for Youth Ages 11-13, Maryland

The program was designed as an after-school program at a Title I middle school located in the urban area of Baltimore County as part of a Team Nutrition mini-grant. The school had an enrollment of about 600 6th to 8th graders who were primarily African American (98%). The curriculum contained fifteen lessons on a variety of nutrition and food safety topics. Pre-and post-tests were administered to 150 youth who attended at least six lessons. A 56% increase was observed in nutrition knowledge, a 32% increase in consumerism knowledge, and a 22% increase in food safety knowledge. This program was funded at \$84,600 through Team Nutrition, EFNEP, FSNEP and Maryland Cooperative Extension.

2) New Jersey: Five-A-Day through Theatre and Role-play—A Creative Arts Approach to Nutrition Education

“Five-A-Day through Theatre and Role-play” is a creative arts education approach to promoting consumption of five servings of fruits and vegetables a day. Between 1997 and 2001, 4,000 youth and adults participated in the program. Evaluation data showed that 90% of younger youth understood the Five-A-Day message; 70% of the older youth intended to increase their fruit and vegetable consumption; and troupe members increased their fruit and vegetable consumption. The program was funded with \$201,000 from USDA and \$3,000 from the New Jersey Department of Agriculture.

3) Maryland: 4-H Nutrition Education After-School Program

In cooperation with the YMCA, Frederick County 4-H staff developed a nutrition education program for youth (primarily 5-12 years old, low income, and African American) living in public housing units in Frederick. Through teacher observation the following outcomes have been noted: 1) approximately 90% of youth increased hand washing; 2) nearly 80% are aware of food-safety dangers of cross contamination; 3) approximately 75% have improved knowledge about healthy food choices; and, 4) nearly 90% have improved skill in preparation of healthy foods. The program received \$9,700 in 2001 from the Food Stamp Nutrition Education Program (FSNEP) with matching funds from Frederick County Extension Office, YMCA, and Big Brothers/Big Sisters.

4) New York: Cooking Up Fun!

Cornell Cooperative Extension staff in seven counties participated in a 2002 pilot project that involved 150 youth, primarily ages 9 to 12, in eighteen "cooking clubs." The purpose of the program was to teach basic food selection, handling, and preparation skills for a healthy diet. The program was an integrated effort of 4-H, EFNEP, and FSNE. Youth completed evaluation forms at each session. Of the 550 evaluation forms completed, 71% of the youth learned new cooking skills; 70% improved cooking skills; 68% intended to make the recipe again; 63% had not made the recipe before the session; and 62% could teach a friend to make the recipe. The program was funded by the New York State 4-H Foundation at \$2,100.00.

Programs of Distinction

In 2005 the process for submitting 4-H programs to a national collection changed to include a peer review process. One program selected for this new collection, called Programs of Distinction, focused on a nutrition and health project in Kentucky.

1) 4-H Health Jam

In Jefferson County, Kentucky, thirty-eight 4th and 5th grade students participated in a two-day overnight camp, combined with a nine week program, targeted toward youth who were at-risk for chronic health problems related to poor diets and sedentary lifestyles.

The national School Health Education Evaluation (SHEE) was administered. A statistical analysis of test data concluded there was a statistically significant ($p < .05$) difference in the pre- and post-SHEE test scores, indicating that the program had a highly significant impact on knowledge, attitudes, and behaviors concerning healthy lifestyles.

Students completed a pre/post test using multiple choice, true/false, and open-response questions. The statistical analysis showed that the program made a highly significant difference ($p < .01$) on the student's knowledge about health careers and a significant difference ($p < .05$) on their knowledge of body systems.

At the end of the eight week follow-up, 80% of the students had completed or exceeded the goal of thirty minutes of daily physical activity.

National 4-H Council Private Grant Supported Projects

1) Healthy Lifestyles

In 2003 and 2004, Kraft Foods, Inc., and Cargill, provided a total of \$225,000 for local grants up to \$7,500 to develop or expand innovative programs for youth ages five through twelve to promote healthy lifestyles

and decrease childhood obesity. Eight projects were funded in eight different states in 2003 and twenty-three community-based projects were funded in eighteen states in 2004. State and county in-kind match totaled approximately \$252,000. The program will continue in 2005 and 2006.

During the two reporting years, 16,930 youth and 3,000 adults were involved in the program. An independent evaluation firm, Halley Research, LLC, conducted an evaluation of the programs both years. Executive summaries and full annual reports for 2003 and 2004 were prepared giving full outcome data. Generally speaking, data from both years indicate youth learned the benefits of good nutrition, the benefits of regular exercise, and the dangers of obesity. They shared what they learned with their friends and family. Of the youth who responded, 62.5% said they planned to eat better, healthier food, and 31.3% said they planned to exercise more often and more regularly. The majority of the participants appeared to be within acceptable weight for their age and height. A large majority of the youth, 94.4%, said they would participate in the program again. Comparable responses were given by the adults.

NEW DIRECTIONS

Healthy Lifestyles is one of the three mission mandates of the National 4-H Youth Development Program, along with Citizenship and Science, Engineering, and Technology (SET). It will continue to be, as it has been for the past 103 years of the program, a priority of the National 4-H Headquarters and state and county 4-H programs well into the future. The organizational structure of the Cooperative Extension System, research grounded in this extension specialists and, nutrition and youth development staff work together to bring the latest and best nutrition and health research and information to young people across America. Content areas will include nutrition and physical fitness so that young people will continue to develop the “Health H” along with Head, Heart, and Hands...all foundation elements of the 4-H pledge.

Section IV – Criteria and Dimensions of Panel Review: Relevance, Quality and Performance

Section IV of the portfolio review document draws on the previous sections and supplementary evidentiary materials to address OMB's Research and Development Criteria and the fourteen dimensions specified in the scoring sheet for CSREES portfolio reviews.

Context: The overall goals of USDA and the President's initiative for a *HealthierUS* provide direction to CSREES nutrition programs and activities. *HealthierUS* calls for improvement in nutrition and physical activity for Americans. USDA's mission is to provide leadership on food, agriculture, natural resources, and related issues based on sound public policy, the best available science, and efficient management. USDA's vision is to be recognized as a dynamic organization that is able to efficiently provide the integrated program delivery needed to lead a rapidly evolving food and agriculture system.

The CSREES vision is that agriculture is a knowledge-based, global enterprise, sustained by the innovation of scientists and educators. The agency's mission is to generate, advance and disseminate knowledge for agriculture, the environment, human health and well-being, and communities. The CSREES agency strategic plan states two major functions: 1) program leadership to identify, develop and manage programs to sponsor university-based and other institutional education, research and extension and 2) fair, effective, and efficient administration of Federal assistance implementing education, research, and extension awards and agreements.

CSREES Nutrition Program has a vision of active, healthy Americans in healthy communities. The Nutrition Program mission is to support CSREES's strategic goal to improve the nation's nutrition and health by providing leadership for strong research, education and extension programs in partnership with the university system and communities to develop the research basis for guidance on diet and physical activity and to develop and carry out effective educational and environmental strategies to improve the nation's health.

The total CSREES budget for nutrition research programs (including SERD starting in 2003 and SBIR) has varied from roughly \$15 to \$28 million from 2000 to 2004. Four knowledge areas are used to track nutrition research in the CRIS⁷ system: nutrient composition of food (701), requirements and function of nutrients and other food components (702), nutrition education and behavior (703), and nutrition and hunger in the population (704, a new addition to the coding system).

Caveats:

- In two of the previous five years, budgets for nutrition were temporarily higher when the agency's budget included funding for the Initiative for the Future of Agricultural and Food Systems (IFAFS).
- Food safety research that supports programming in Cooperative Extension was reported in CSREES's portfolio for goal 3 which was reviewed in 2005.
- Because KA704 is a new code, most food security related research has been reported in KA703 during the time period covered by this portfolio review.

⁷CRIS includes projects conducted or sponsored by USDA research agencies (e.g., the Children's Nutrition Research Unit at Baylor), state agricultural experiment stations, the state Land Grant university system, other cooperating state institutions, and participants in a number of USDA-administered grant programs (SBIR, NRI, SERD). Most CES outreach education projects are not included in the current CRIS, but a comparable system is in development (page 36 and page 52, Nov 1)

- Funding for CES, EFNEP, FSNE and Community Food Projects is not currently tracked in CRIS.

Criterion 1 -- Relevance [Is Federal investment in CSREES nutrition activities and services important and appropriate, given national needs, problems and priorities?]

1.1 Scope (coverage of work with available funds)

CSREES takes a priority-driven approach to allocating its funding and human resources to meet national nutrition needs. Priorities are determined by agency goals/objectives, legislative authority, stakeholder input, and strategic positioning within the larger system of public and private agencies and organizations that address needs and problems in nutrition and health.

Figure 1 describes how CSREES research, education and extension activities relate to major programs and activities of other agencies (food composition, dietary guidance, monitoring and food assistance) and contribute to achieving the overall goal of improving the nation's nutrition and health. Although research, extension and education activities are conceptually part of all four knowledge areas, CSREES nutrition program work related to knowledge areas 701 and 702 tends to have a heavier research emphasis, while work related to 703 and 704 has more emphasis on extension and education. Taken together, work in these four knowledge areas represents the breadth of CSREES nutrition activities that are coordinated with the work of other USDA and Federal agencies to improve the nation's nutrition and health.

According to CRIS searches for KAs 701,702 and 703, CSREES has administered \$105 million in funds for human nutrition research between 2000 and 2004, with projects and programs benefiting every U.S. state and territory (Table 5). Between 2000 and 2004, CSREES funds (roughly \$15-28 million per year) supported 22% - 41% of the total federal and non-federal research expenditures for nutrition research that is tracked by USDA's CRIS system (Table 1). As shown in Section II Table 2, the largest CSREES expenditure categories for nutrition research in 2004 were NRI competitive grants (\$9.3 million), Hatch (\$3.9 million), special grants (\$3.7 million), and Evans Allen (\$2.3 million). However, it should be noted that most projects funded by HHS and NSF are not tracked through CRIS.

Table 3, shows CSREES nutrition funding and Table 4, shows the number of projects for knowledge areas 701, 702 and 703. In these tables, research that would have been coded as KA 704 is included with KA 703. The KAs do not currently reflect funding for extension activities such as Cooperative Extension System programs, EFNEP, FSNE and Community Foods Competitive Grants.

EFNEP is funded and its activities are determined via its own authorizing legislation as part of 3(d) directed Smith-Lever funds, administered by CSREES. In 2004, \$57 million was used to support this specialized education for low-income families and youth. 133 of Federal funding for EFNEP in the inputs section that Wells wrote).

CSREES contributions to Food Stamp Nutrition Education (FSNE) which is administered by USDA/FNS, are shown on (page 151 from the inputs section of Helen's pages). In 2004, CSREES contributed \$109,674 at the agency level in partnership with universities that contributed \$167,540 for national coordination of Extension's role in FSNE. FNS matched the CES and/or Land-Grant Universities' additional commitment of more than \$115 million to manage and conduct FSNE at the state and local levels. Expenditures for community food projects were estimated to be \$4.6 million in 2004.

The average annual appropriation, over the five years from 2000 to 2004, for nutrition research/education and Extension/outreach is approximately \$101 million. This does not include state or county appropriations for EFNEP, FSNE and Community Food Projects or FNS funds for FSNE. The total average appropriation for CSREES nutrition programs is slightly less than 10% of the total average annual appropriation of \$1 billion for

CSREES over this time period. It is likely that given the current status of health-related expenditures in this nation CSREES should allocate a larger share of its budget to Food Science and Nutrition Education. Most of the nutrition appropriation is for Extension/outreach programs, about \$80 million compared to about \$21 million for research/education. Most of the Extension/outreach appropriation is for EFNEP—about \$57 million.

1.2 Focus (ability to remain focused on issues, topics, critical national needs)

Poor diets and sedentary lifestyles are major causes of morbidity and mortality in the U.S. Specific diseases and conditions linked to poor diet include cardiovascular disease, hypertension, dyslipidemia, type 2 diabetes, overweight/obesity, osteoporosis, constipation, diverticular disease, iron deficiency anemia, oral disease, malnutrition, and some cancers. CSREES in partnership with the university system and communities develops the research basis for guidance on diet and physical activity and develops and carries out effective educational and environmental strategies to improve the nation's nutritional health.

Smith-Lever formula funds are mainly allocated to state and county Extension programs in partnership with Land Grant universities. Within this complex system, nutrition programs are mainly carried out by educators at the state and county/tribal levels, based on locally identified needs and priorities. Nutrition and health is one of Cooperative Extension's national base programs. Base program messages and strategies change with advances in research-based knowledge, needs/preferences of the target audiences, and technological developments, but Extension's overall emphasis on nutrition has been steady and strong over the years. The constancy of Extension base programs is complemented by EFNEP, FSNE, and a series of national emphasis areas that receive special attention and targeted resources to meet emerging needs. *Reversing Childhood Obesity Trends: Helping Children Achieve Healthy Weights* (RCOT) is a national Extension nutrition emphasis area (<http://www.CNR.Berkeley.edu/cwh/activities/trends.shtml>). CSREES National Program Leaders (NPLs) work with RCOT's national leadership team to develop specialized resources for planning/teaching/evaluation, coordinate activities, and facilitate communication via a dedicated website, listserv, focused dialog teleconferences, and a distance education course that is currently under development.

1.3 Contemporary and/or emerging issues (issues consistent with and relevant to portfolio and mission)

CSREES grant programs clearly state national needs to be addressed in their requests for research and integrated proposals. Nutrition grant review panels use relevance to the needs of consumers as one of the evaluation criteria for establishing funding recommendations.

NPLs anticipate and identify emerging nutrition issues by leading review panels for competitive programs and by participating in scientific meetings, federal interagency working groups and stakeholder listening sessions. They also provide national leadership to special emphasis areas such as the RCOT. In addition, leadership and support from CSREES has enabled researchers and educators from RCOT Land Grant colleges to make preliminary plans for a randomized/controlled community intervention to reduce risk of Type 2 diabetes in overweight African American children.

USDA's National Agricultural Research, Extension, Education and Economics (NAREEE) Advisory Board provides evaluations and recommendations to CSREES and its sister agencies. The Board is congressionally mandated and has thirty-one members. NASULGC also provides input to CSREES for future research and outreach programs.

CSREES NPLs and administrators plan to continue to sponsor specialized nutrition conferences in addition to small annual conferences for current recipients of competitive grants, to assure that CSREES activities address

the most pressing issues and to gain wider visibility and recognition within the broad community of stakeholders represented by the nutrition honeycomb.

CSREES holds a number of conferences and stakeholder meetings to provide input for its nutrition outreach program. Examples:

- A conference on nutrition education for diverse audiences was sponsored by CSREES in 2001 to disseminate information and gather stakeholder recommendations/feedback.
- CSREES NPLs worked with a team of state Extension specialists to offer national conferences on nutrition, food safety and health in 2002 and 2004. Accountability developments, emerging issues, and sources of funds to leverage existing resources were emphasized in these conferences.
- CSREES and Land Grant university partners hosted a national FSNE conference in 2004 to help the 220 participants understand organizational cultures and improve interagency communications. Participants rated the conference as highly valuable/useful (average of 1.3 on a scale with 1= highly valuable/useful and 3= not useful) and the greatest perceived benefit was that the conference allowed all stakeholders to learn about anticipated changes in guidance and what is needed for success at the state and local levels (www.ces-fsne.org).

Over the past thirty years, children and adults in the U.S. have been getting heavier and heavier and now that almost 2/3 of adults in the U.S. are overweight or obese, obesity prevention has become an issue of major national importance. NRI integrated research addresses this major issue by establishing the following priorities for programs that combine research, education, and/or extension:

- 1) Improve our understanding of the behavioral and environmental factors that influence obesity.
- 2) Develop behavioral and environmental instruments for measuring progress in obesity prevention.
- 3) Develop effective intervention strategies for preventing obesity.

Examples of priority focus areas for NRI-sponsored study of factors influencing obesity are:

- social and psychological factors, including the development of self-esteem, self-efficacy and resiliency, family and community influences and attitudes toward food, physical activity and health;
- the role of lifestyle, including physical activity, cultural and ethnic factors and the influence of past dietary patterns; the role of educational factors, cognitive ability and informational resources;
- the influence of economic factors and public policy issues, including the community environment, food availability, accessibility, cost, individual income and propensity to save, food insecurity, time constraints and public and private assistance programs.

In 2004, with input from the Land Grant system, CSREES summarized the issues related to overweight/obesity and provided guidance for future program priorities (<https://nifa.usda.gov/program/obesity-prevention-healthy-weight-programs>).

An important emerging concern is the aging of the current cohort of professional research scientists and educators in nutrition with advanced degrees. Figures on pages 63-64, show that NRI research projects provided funding that supports about 15-30 years of graduate study and 2-22 years of postdoctoral study (spread over the course of the grants) in 2000 - 2004. One of the goals for the future is to have greater coordination between CSREES's research and higher education programs to increase support for students.

In all areas of biology, the need to bring new professionals into the field is especially important for increasing minority representation. Of the 4216 new biological sciences PhDs in 2001 in the U.S., less than 3 percent (or 136) were Black, and nearly 4 percent (or 164) were Hispanic/Latino, fifteen American Indian, and 109 other (<http://www.nsf.gov/statistics/wmpd/pdf/tabf-6.pdf>). Of nearly 62,000 B.S. degrees in biological sciences in 2001, only 16 percent (or 9662) were to underrepresented minorities (see <http://www.nsf.gov/statistics/nsf04318/pdf/sectb.pdf> Table 4 (page 62 historically black colleges).

An example of how CSREES resources help overcome this problem is that twenty-five BS degrees were awarded in food and nutrition studies/science by Historically Black institutions in 2004. These colleges are part of the Land Grant system and receive partial support from CSREES. Other examples are CSREES/SERD's support of the multicultural scholars program at North Dakota Grand Forks that trains American Indian students in nutrition, Cornell University's multidisciplinary food science summer research program, the Woodlands Wisdom project which allowed six tribal colleges to offer associate degrees in food and nutrition (page 86) and Alabama A&M's cooperative program to strengthen scientific preparation for students in the human sciences which are all reporting progress in attracting minority students to food/nutrition/human ecology careers. New directions have been identified to continue and strengthen these programs.

1.4 Integration (Is there a functional integration of research, extension and education efforts so that programs and activities reach/serve a wide variety of audiences or stakeholders in appropriate formats?)

Nutrition is an integrated science in itself, bringing together genetics, basic biology and physiology with psychology, education and communications. This synergy in nutrition brings together basic nutrition researchers, nutrition education researchers, practitioners and other allied professionals. CSREES conducts an integrated and cohesive program of research, education and extension activities to improve the nutritional health of Americans, as illustrated by the CSREES nutrition logic model, Figure 1 (discussed above) and the following examples.

CSREES is in a unique position to achieve synergy by coordinating federal funding for research with funding to support higher education and extension to promote comprehensive approaches that address needs at the local, state and national levels. For example, in selecting awardees for NRI and other CSREES competitive nutrition grants, a high value is placed on integrating research, extension and education. The IFAFS program in nutrition in 2000 and 2001 and the obesity section of the NRI in 2003 and 2004 funded only integrated projects. Over the five years from 2000 to 2004, approximately \$35 million has been awarded for integrated projects with most focused on obesity prevention.

Two very strong integrated projects were awarded in 2000. With CSREES support, a multidisciplinary team from three western states developed "Win the Rockies", a health focused obesity prevention program. Another interdisciplinary project team from nine universities received CSREES support to determine calcium requirements, improve intake of calcium rich foods and improve bone health in adolescents. A third example of integrated research and extension is the NC219 multi-state team's work to design a theory-based intervention to increase fruit and vegetable intakes of young adults. After proving the success of a theory-based strategy to increase fruit and vegetable intake and move subjects to a more positive stage of change, the researchers developed a "F&V Express Bites" web-based intervention to make their approach more widely available to learners and educators nationwide. The NC219 group has also studied how to adapt its materials and approaches for Native Americans. They are currently designing and testing a web-based program to de-emphasize dieting and promote healthy lifestyles to prevent excessive weight gain in young adults (page 124-125). In addition to maintaining the longer term Multistate Research Fund projects, the research/extension team has been awarded \$3.5 million from CSREES in competitive funding for their work.

Similarly, NRI funds were leveraged with FSNE, Share our Strength, and Extension state funds to develop and implement "La Cocina Saludable" at Colorado State University to produce a set of research-based nutrition education tools with demonstrated validity and effectiveness in reaching an underserved audience.

1.5 Multidisciplinary balance (Are problems being addressed with an appropriate mix of mission-based and fundamental research and disciplines?)

CSREES-sponsored research covers a range of high-priority topics with specialized studies and programs that utilize expertise and tools from highly germane disciplines. For example, in obesity, CSREES funds through the NRI and Hatch are used to study topics ranging from genetically determined cellular mechanisms that regulate hunger/appetite to development of eating preferences in day care settings (page 84). In all these areas, NRI and other CSREES grant announcements call for prospective PIs to assemble key personnel with appropriate expertise in all the project's major subject matter areas. Peer review panels evaluate the expertise of the key personnel to assure an appropriate and adequate mix of disciplines is covered by the research team.

CSREES's emphasis on inclusion of many appropriate disciplines extends beyond research projects. Of 642 grants to small businesses from SBIR in the past five years, 12% were allocated to projects of potential to use to nutrition researchers and educators. Examples range from a field-friendly method of analysis for vitamin A in foods and human serum to a CD-ROM that helps teachers integrate nutrition concepts into math, science, social studies and language art curricula (pages 80-81).

Criterion 2 – Quality [How an investment ensures the highest quality of activities are conducted and provided. The panel focuses on dimensions of the quality of proposals accepted for funding such as the significance of findings, level of stakeholder/constituent inputs proper alignment with current state of science and the use of appropriate methodologies.]

2.1 Significance of findings.

Most of the CSREES-funded projects allocated in 2000-2004 are still being conducted, so outcomes cannot be fully determined at this time. Nevertheless, this portfolio documents hundreds of outcomes in the form of publications in high-quality journals, presentations of findings at major scientific and professional meetings, innovative curriculum materials, new methodology for lab and field research, innovative products, novel approaches to education, and a diverse group of highly trained scholars in food and nutrition. Publications resulting from CSREES-funded projects have been cited in policy documents, such as the "Report of the 2005 Dietary Guidelines Advisory Committee", or IOM publications of "Dietary Reference Intakes".

The network of the CSREES federal office and the university system is an important step in the widespread dissemination of knowledge generated by research, education and extension activities. The importance and significance of project outcomes is partially assured by the rigorous process used to select research and integrated projects for funding and to direct planning of formula-funded projects. All CSREES competitive proposals undergo rigorous review by an external peer review panel. Less than 20% of the proposals received are funded. Activities supported with formula funds are reviewed internally by each university involved and by NPLs, with consideration for the agency's mission, the intent of the legislative act, and the inclusion of measurable outcomes. Multistate Research Fund projects undergo an extensive regional evaluation process before approval. An Administrative Advisor from the university system and a CSREES liaison for each Multistate Research Fund project help ensure high quality projects.

2.2 Stakeholder/constituent inputs

CSREES utilizes a number of mechanisms to bring stakeholder input into their prioritization and planning process. One example is the NAREEE Advisory Board mentioned above. The agency's interest in stakeholder input is also illustrated by the following statement that appears on the first page of NRI requests for applications on the CSREES website: "**STAKEHOLDER INPUT:** The Cooperative State Research, Education, and Extension Service (CSREES) is requesting comments regarding this request for applications (RFA) from any interested party. These comments will be considered in the development of the next RFA for the program."

In administering formula funds (Hatch, Smith-Lever, etc.), CSREES requires five year plans of work that document the process used to solicit stakeholder input in determining priorities for the use of these funds (page 21).

Examples of CSREES leadership in forums for gathering stakeholder input:

- The CSREES nutrition program held a “Nutrition Education for Diverse Audiences II: Integrating Research and Practice” conference in 2001 to share materials, strategies and resources among leaders from EFNEP, FSNE, and other stakeholders.
- In 2004, NPLs for competitive nutrition grants hosted the first annual national meeting for awardees of NRI integrated obesity grants. This conference established meaningful communications and connections between and among the agency and its major stakeholders.
- A CSREES listening session in 2002 identified topics of interest to stakeholders, especially in the Family Resources and Consumer Sciences area. Currently, listening sessions related to CSREES and other aspects of the Farm Bill are being conducted by the Secretary of Agriculture.
- National conferences on nutrition, food safety and health in 2002 and 2004 (see section 1.3).

In response to stakeholder input the program has changed in several important ways. For example, there is a much greater emphasis on obesity than in previous years. The focus is clearly on obesity prevention as opposed to treatment, on the behavioral rather than the biological aspects of obesity, on the importance of food as part of obesity prevention, and the importance of taking advantage of the synergy that can result from the integration of research, education and extension.

2.3 Alignment with current state of science-based knowledge and previous work

CSREES strives to take advantage of the latest research and develop up-to-date knowledge/resources. For example, in 2000-2004, seventy-seven SBIR grants provided over \$10 million for food and nutrition-related projects such as integrated nutrition education lessons on CD-ROM, a rapid field test for vitamin A in fortified foods and human serum, and a computerized system of portion size estimation.

To sharpen the focus of CSREES-funded research addressing obesity, NRI projects for KA701 and KA702 are now directed to a smaller number of larger grants on “bioactive food components for optimal health”. Nutrition education and behavioral research and integrated projects focused on obesity are now directed to a separate NRI section (31.5 – Human Nutrition and Obesity), most of which is coded as KA703.

As described in section 3.1, EFNEP has a nationwide reporting system that enables CSREES to capture behavioral outcome data for adults and youth who participate in the program. A multi-state committee has been working for more than a year to utilize new technologies such as geographic mapping to target program delivery and develop new and more reliable instruments and impact indicators. With these tools, EFNEP will be able to address the most current nutrition issues and priorities in its system for documenting dietary changes and other program outcomes (page 146). A revised version of the EFNEP Reporting System known as NEERS5 will be released in December 2006.

CSREES and other FSNE partners are in the process of developing a system to collect outcomes data for its various programs. The Community Nutrition Education (CNE) logic model was developed by a FSNE evaluation committee between 2001 and 2003. Interagency activities are underway to develop a feasible method of data collection that meets the needs of the program’s major stakeholders, based on this logic model. In March 2003 a FSNE Program Development Team was created to help identify national and state priorities for effective FSNE programming within CES/CSREES.

2.4 Appropriate and/or cutting edge methodology/techniques for funded projects

CSREES emphasizes projects and programs that will make new contributions to advance nutrition knowledge and help researchers and educators use the latest tools in their work. For example, NRI integrated projects are directed toward innovative approaches to obesity prevention in 3 priority areas: a) hypothesis-driven research to fill knowledge gaps that are critical to the development of practices and programs to address the problem area; b) create educational deliverables (e.g., interdisciplinary curricula and/or experiential learning for graduate and undergraduate students) that will train the next generation of scientists and educators who will work in the problem area; and/or c) deliver an effective extension/outreach program that will lead to measurable behavior change in an identified audience or stakeholder group.

An example of appropriate or cutting edge methodology in portfolio 4.2 is the updating of EFNEP's reporting system. Since 1969, CSREES has provided leadership to EFNEP which is supported by special 3(d) funding (\$52 million in 2004) to reach limited resource families and youth in all fifty states and six territories. EFNEP uses a unique EFNEP Reporting System (ERS) to gather data on knowledge and skills that are developed through a series of experiential lessons in diet quality, physical activity, food safety, and/or food resource management. A group of national experts is working with CSREES NPLs to update the web-based system and revise the impact indicators to reflect new dietary recommendations.

Another example of Extension's work in this dimension is a national project that utilized the community nutrition logic model and an occupational analysis process to identify the most important knowledge and professional skills for local/county nutrition education program coordinators. Based on this analysis, CSREES and state partners developed an orientation guide, a resource guide and a mentoring program for FSNE and EFNEP in order to transmit necessary competencies to professionals in the field.

Criterion 3 -- Performance [What the portfolio produces. The panel focuses on dimensions of productivity, comprehensiveness, timeliness of reporting, agency guidance, and accountability of projects. Examples demonstrate and justify how CSREES is doing.]

3.1 Productivity (Does the CSREES nutrition program create and provide services to meet its goals through funding, directing, managing and partnering with its various stakeholders?)

The allocation of competitive grant funds to appropriate goal and mission-oriented projects is apparent via data from the CRIS system. For formula funds, CSREES does not dictate specific goals, but relies on NPLs to convey the mission and goals of the agency and the authorizing legislation.

Several CSREES programs are enhanced by matching contributions. For example, Community Foods Competitive Grants Program projects require 1-1 dollar match. Assessment of community food environment and household food security are conducted in these projects, followed by activities to promote awareness of the food system [page 202].

The EFNEP program does not require matching funds, but it has been extremely successful in multiplying its resources. In the past five years, \$84 million in grants and other contributions and volunteers' donations of time amounting to more than 1,200 FTEs greatly extended the reach and effectiveness of EFNEP, allowing them to reach almost three million learners in the past five years (page 134 and 136). EFNEP's reporting system data have been summarized to show that in addition to knowledge gains, 93% of almost a half million adult learners improved food management, nutrition and/or food safety practices after completing EFNEP lessons in 2000-2004 (adult and youth impact measures, page, 137). Furthermore, studies that apply standard cost-benefit approaches show that EFNEP families save as much as \$10 in health care costs and \$2.48 in food costs for each dollar invested in EFNEP (page 138). Specific examples of how EFNEP is making a difference in the lives of

families and youth, including Black, Native American Indians, Hispanics and Asians, are shown in the EFNEP success stories, beginning on (page 138).

FSNE has a more complicated and varied infrastructure than EFNEP and necessitates a different type of data collection for the purpose of national aggregation. When nationwide data were collected and summarized for FSNE in 2002, over five million direct contacts and over thirty-two million indirect learner contacts were made. The CNE logic model is an eco-system model which documents outcomes in “rested systems” individual, community and societal. The model incorporates social marketing, a socio-ecological framework, and other behavioral models, is the basis for these planned activities. It is reasonable to expect appropriate outcomes when consistent reporting indicators are utilized from state to state. In addition, examples of outcome data were gathered from 43 states in 2003.

FSNE specific outcome measures originally varied from state to state, limiting the ability to aggregate individual items, but the reports were consistent with the program’s purpose and the CNE logic model. For example, the most prominent outcomes reported were demonstrated ability to use the Dietary Guidelines and Pyramid to plan meals or make food choices (9.7% of all reported outcomes) and demonstrated ability to save money when shopping for food (8.3% of reported outcomes). Success stories in Section III of this document give more specific examples of reported FSNE accomplishments. For example, Utah uses a reporting system similar to EFNEP and found that 66% of FSNE participants had behavioral outcomes such as planning menus, adopting tips to save money when shopping for food, and even being able to have enough food for their families (page 163). Similarly, there was a 21% increase in the number of FSNE participants in Mississippi who increased fruit and vegetable intakes to 5 or more servings per day and a 35% increase in the number of participants who compared prices before they bought food (page 164).

The well established 4H Youth Development Program reaches youth with a broad array of educational programs, including programs to improve food, nutrition and health. As with other programs that are highly adaptable for the needs of local communities, national outcome measures are not routinely collected with 4H programs, but the potential impact is extensive, given the broad reach of the program. For example, over 2.3 million youth participated in healthy lifestyle education, over one million in food and nutrition, and over 400 thousand in food safety education, over 100 thousand in fitness/sports, and over thirty-five thousand in physical health in 2003. A 4-H Program evaluation national committee is now working to develop a system with consistent outcome indicators.

3.2 Comprehensiveness/completeness of areas of work, outputs and outcomes

CSREES Nutrition projects span a wide range of topic areas within the parameters defined by their mission and legislative directives. Identifying genetic markers affecting taste preferences (page 103) developing new food products with enhanced phytonutrient content (page 107), enhancing community food systems, educational interventions targeted to specific behavioral patterns of individuals, comprehensive school-based program for low-income African American children (Bringing It Home, page 87), and community-wide interventions (WIN the Rockies page 89) are examples of CSREES-supported research and integrated projects. A more complete list of examples is on (page 97). In addition to publications and presentations to share knowledge with professional colleagues, each of these projects has established linkages or developed materials to extend the knowledge or developments to community-based stakeholders. Together, these projects and programs represent a breadth of activities to improve the nation’s nutrition and health.

3.3 Timeliness (Do programs evolve with changing issues/knowledge and are funded activities completed within funding time frame?)

CSREES utilizes the comprehensive reporting system known as CRIS to track progress of projects and assure that activities and accomplishments process according to proposed and approved timeframes. For Smith-Lever formula-funded Extension activities with less discrete start and end dates, NPLs monitor Plans of Work and Annual Plans that are submitted by the states. This state-Federal feedback system is used to make adjustments as needed to keep nutrition and related projects/activities progressing in a timely manner.

As stated above, CSREES gathers stakeholder input, participates in leading nutrition conferences, and works in concert with other agencies and organizations to keep its activities in line with changing knowledge, issues and challenges in nutrition. For example, as interest in obesity prevention has mushroomed in recent years due to the obesity epidemic, there is more and more concern that hasty efforts to prevent obesity will have a negative impact in the form of increasing eating disorders, problems with body esteem, and depression. Projects such as the Hatch-supported study of a non-diet treatment option with obese female restrained eaters are addressing these new problems. This example project has already shown that a non-diet approach can achieve successful weight loss while enhancing body acceptance and dietary quality (page 88). A similar approach has been taken by the *WIN the Rockies* project. Other specific examples of research projects and their outcomes are listed on pages (121-123).

3.4 Agency guidance (strength of leadership and management relating to the portfolio)

The organizational structure of USDA indicates the flow of agency guidance from the Secretary of Agriculture, to the Undersecretary for Research, Education and Economics (REE), to the CSREES Administrator, to the CSREES Deputy Administrators for Families, 4-H and Nutrition and Competitive Programs, to the CSREES nutrition team, to the university system and communities. At each organizational level there are committees that coordinate plans and activities with entities with similar responsibilities. The President's "HealthierUS" initiative is a good example of a message that was disseminated from the highest office to communities across the country.

Now that obesity prevention and treatment have become high priority concerns nationwide, it is important for agency leaders to direct the resources under their control to high-priority areas that avoid duplication with other programs. CSREES has provided strong leadership by establishing and maintaining the agency's focus on high priorities, as discussed in relation to criterion 1.2 above. CSREES administrators and professionals work in concert with other agencies and organizations to coordinate activities and avoid wasteful overlap. For example, CSREES is represented on a new interagency committee on obesity that includes the Department of Health and Human Services, the National Science Foundation and the Presidential Office of Science and Technology Policy (Page 90, Nov 1).

Strength of leadership in managing the CSREES portfolio is also demonstrated by effort needed to develop clear requirements, instructions and procedures for the various competitive grants programs. NPLs monitor the process by which grant supported activities and results are reported and they work with grant recipients to disseminate findings to professionals and practitioners in the field. Similarly, CSREES's nine nutrition NPLs play a key role in communicating the Agency's goals and priorities to state and local Smith-Lever funded Extension partners. By facilitating interstate communication and coordination, their input and coordination are essential to maximize efficiency of utilization of this important nationwide network.

3.5 Accountability (completion of funded projects with thoroughness, clarity, timeliness, adequacy and usefulness)

CSREES takes serious steps to assure accountability in its utilization of resources. For example, CSREES utilizes the CRIS system to provide readily accessible data and to track progress and outcomes of CSREES-supported research projects. In addition, NRI and other CSREES grants require official justification and formal approval whenever a project is extended or renewed. EFNEP's ERS4 is being updated to make it an even more efficient and effective tool for summarizing outcomes and providing management guidance from this unique program. For other Extension nutrition programs, plans of work for formula-funded activities are reviewed by at least two NPLs and deficiencies are required to be corrected by Extension Directors before reviews are considered complete (Nov 1, page 14). CSREES is working proactively with Land Grant system partners to develop a new system with a complementary training component to enhance CSREES's ability to monitor and guide the performance of activities supported with Smith-Lever formula funds (37 Nov 1).

Glossary of Acronyms and Terms

ADA	American Dietetic Association
AMS	Agricultural Marketing Service
APHA	American Public Health Association
AREERA	Agricultural Research, Extension and Education Reform Act of 1998
ARS	Agricultural Research Service
ASN	American Society for Nutrition
BMI	Body Mass Index
BPI	Budget and Performance Integration
CDC	Centers for Disease Control and Prevention
CES	Cooperative Extension System
CFS	Community Food Security
CNE	Community Nutrition Education (Referring to the del)
CNPP	Center for Nutrition Policy and Promotion
CNRC	Children's Nutrition Research Center
CRIS	Current Research Information System
CSREES	Cooperative State Research, Education and Extension Service
CVD	Cardiovascular disease
CYFAR	National Children, Youth and Families at Risk
DACUM	The Developing A Curriculum process is a methodology used to create an occupational skill profile that can be used in instructional program planning, curriculum development, training material development, organizational restructuring, employee recruitment, training needs, career counseling, and job description.
DDPP	Diabetes Detection and Prevention Projects
DRI	Dietary Reference Intakes
ECOP	Extension Committee on Organization and Policy
EFNEP	Expanded Food and Nutrition Education Program
EIRP	Extension Indian Reservation Program
ERS	Economic Research Service
ERS4	Evaluation/Reporting System, version 4. This is the consistent terminology for use in reports.
FAEIS	Food & Agricultural Education Information System
FASEB	Federation of American Societies for Experimental Biology
FCS	Family and Consumer Sciences
FDA	United States Food and Drug Administration
FNS	Food and Nutrition Service
FSIS	Food Safety and Inspection Service
FSNE	Food Stamp Nutrition Education
FTE	Full-Time Equivalent
FY	Fiscal Year
GAO	Government Accounting Office
HHS	United States Department of Health and Human Services
HIS	Hispanic Serving Institutions
IFAFS	Initiative for Future Agriculture and Food Systems
IFT	Institute of Food Technologists
IOM	Institute of Medicine
IPM	Integrated Pest Management
ISBNPA	International Society of Behavioral Nutrition and Physical Activity

IT	Information Technology
KA	Knowledge Area
MRF	Multistate Research Fund
NAREEE	National Agricultural Research, Extension, Education and Economics
NAS	National Academy of Sciences
NASO	National Association for the Study of Obesity
NASULGC	National Association of State Universities and Land-Grant Colleges
NCES	National Center for Education Statistics
NCI	National Cancer Institute, NIH
NEERS5	Nutrition Education Evaluation and Reporting System, version 5
NHANES	National Health and Nutrition Examination Survey
NIDDK	National Institute of Diabetes and Digestive and Kidney Diseases
NIFSI	National Integrated Food Safety Initiative
NIH	National Institutes of Health
NPAL	National Planning and Accountability Leader
NPL	National Program Leader
NRCS	Natural Resources Conservation Service
NRI	National Research Initiative
NRICGP	National Research Initiative Competitive Grants Program
NSF	National Science Foundation
ODPHP	Office of Disease Prevention and Health Promotion
OMB	Office of Management and Budget
PART	Program Assessment Rating Tool
PBH	Produce for Better Health Foundation
PI	Principle Investigator
PMA	President's Management Agenda
POW	Plans of Work
PREP	Portfolio Review Expert Panel
P&A	Planning and Accountability
RCOT	Reversing Childhood Obesity Trends: Helping Children Achieve Healthy Weights Project
REEIS	Research, Education, and Economics Information System
RFA	Request for Applications
RPA	Research Problem Areas
RREA	Renewable Resources Extension Act
SAES	State Agriculture Experiment Stations
SARE	Sustainable Agriculture Research and Education Program
SERD	Science and Education Resources Development
SBIR	Small Business Innovation Research
SNE	Society for Nutrition Education
State	For System Leveraging Refers to CSREES' state partners, land-grant universities and colleges.
State Agency	Refers to state Food Stamp Agencies, unless identified as another specific state agency.
USDA	United States Department of Agriculture
WIC	Special Supplemental Nutrition Program for Women, Infants and Children